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The Refrigeration Service Engineer

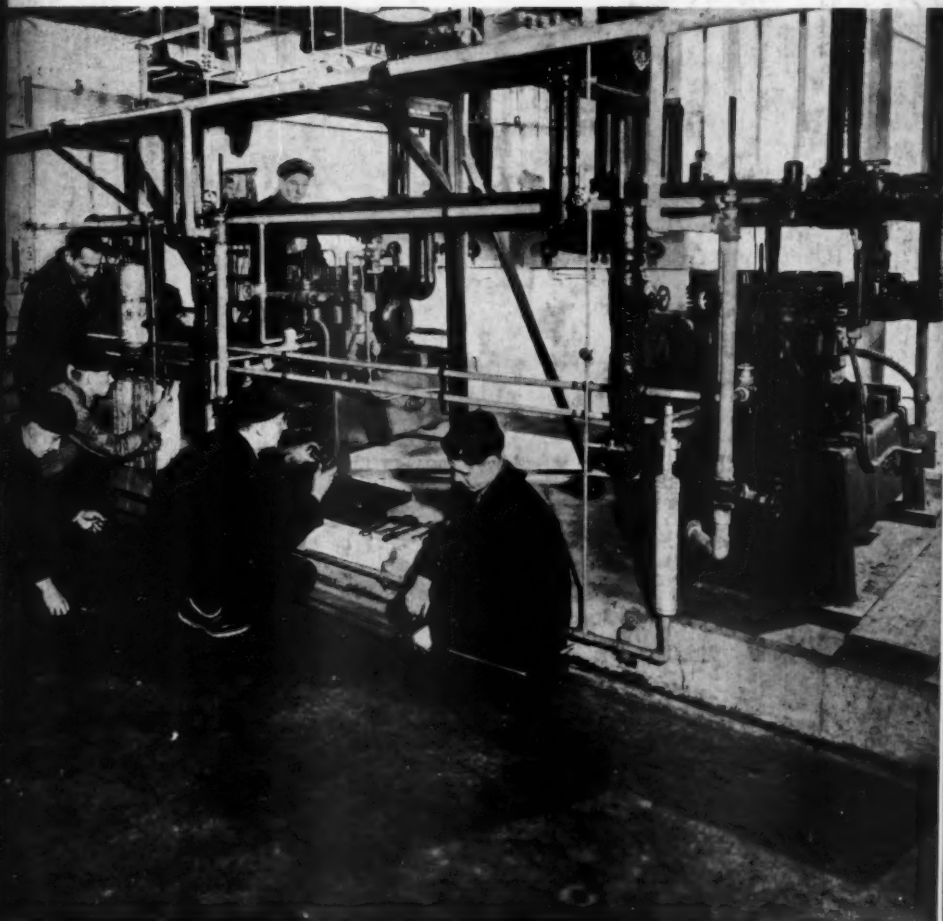
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FEBRUARY, 1944



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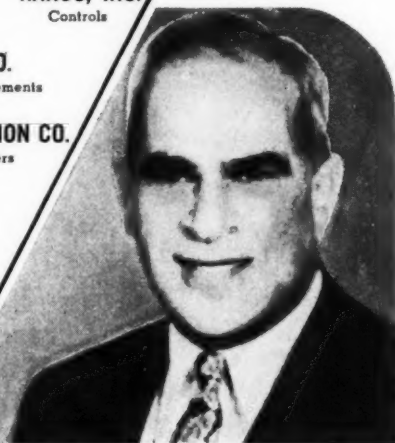
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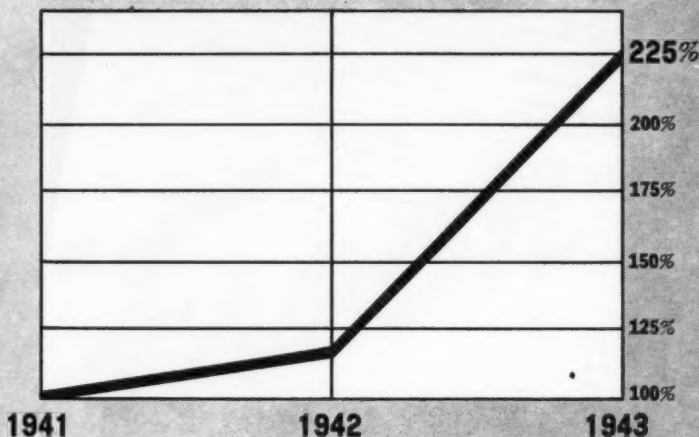
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SERVICE NEWS

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* * * * *

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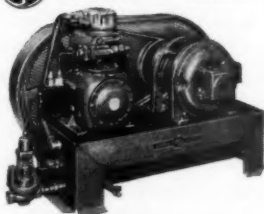
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The Refrigeration Service Engineer

Vol. 12

No. 2

February, 1944

A Monthly Illustrated Journal Devoted to the Interests of the Refrigeration Service Engineer in the Servicing of Domestic and Small Commercial Refrigeration Systems and Oil Burners

Official Organ
REFRIGERATION SERVICE
ENGINEERS SOCIETY

The Cover

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The Refrigeration Service Engineer

Vol. 12, No. 2

CHICAGO, FEBRUARY, 1944

\$2.00 Per Annum

Methyl Chloride Limitations

By Walter O. Walker*

THE primary purpose of this article is to discuss the refrigerant, methyl chloride. When intelligently used, there is no better refrigerant than methyl chloride. When misused, trouble may result. This refrigerant when mixed with air in well-known and specific mixtures is explosive; when breathed in certain concentrations and periods of time, it is toxic.

Indiscriminate use of methyl chloride in air conditioning and certain other installations may lead to hazards due to toxicity and resulting from explosions. The following deals with the limitations related to methyl chloride and is given for the benefit of those who are tempted, due to present conditions, to make new advised use of this refrigerant.

Methyl Chloride as Refrigerant

History has proved methyl chloride to be a very fine refrigerant, both from the theoretical* as well as the practical viewpoint. It is equal to any other refrigerant in its ability to do the job. Certain definite limitations, mentioned above and discussed further below, must be kept in mind when using methyl chloride. Otherwise, it is possible for hazards to develop. If the limitations of methyl chloride are kept in mind and

given proper consideration when the refrigerant is used, there is complete safety in the use of this refrigerant.

Safety in the use of a refrigerant is a much over-worked phrase. Refrigerants produce very few casualties compared to those resulting from other causes. In fact, the number of accidents from refrigerants are less than those occurring where roller skates are left on the floor, than those associated with the bath tub and very much less than those produced by automobiles and the gas fired kitchen stove. We are all prepared to accept the hazards associated with these other sources of accidents but play up to an undue extent an accident occurring as the result of undue exposure to a refrigerant.

At this point attention should be called to the article "Methyl Chloride Limitations" by the writer of this article, in which is reproduced portions of the ASA Code containing recommendations for the use of various refrigerants. In addition, another article by Paul B. Reed, Chairman, Wartime Educational Committee, Refrigeration Service Engineers Society, is very important. Mr. Reed's article deals with the practical aspects associated with the relationship between "Freon 12" and methyl chloride.

Both of these articles deserve careful consideration. Copies of the first article may be obtained by writing to the Ansul Chemical

*Research Director, Ansul Chemical Company.

Company. The second article appeared in *REFRIGERATION SERVICE ENGINEER*, August, 1943. In addition a special bulletin was circulated to all members of Refrigeration Service Engineers Society. About two years ago there appeared a very good article in the *REFRIGERATION SERVICE ENGINEER* covering much the same material discussed by Mr. Reed. Both of these latter articles are particularly valuable since they are designed to cover the general subject of a change-over from "Freon 12" to methyl chloride.

Hazards of Methyl Chloride

In using methyl chloride, it is always well to keep in mind its limitations for unless we do so, some hazard can develop. As pointed out above, these hazards can become acute where larger amounts of methyl chloride are involved such as in air conditioning or in larger installations of other types. In smaller units there has been very little hazard in the past except where some service engineer has assumed that he can take quantities of methyl chloride over a considerable period of time without having any undue ill effect.

There has not been a great deal of trouble to date despite the fact that thousands of machines were changed over from "Freon" to methyl chloride about two years ago and that again this summer thousands and thousands more were changed over. In addition, several hundred thousand machines containing methyl chloride have been in operation over a long period of time. However, where very large quantities of methyl chloride are used, there may be some difficulty unless proper engineering practice is followed.

It is also important that extremely good supervision be attained. Because of the fact that it is not possible always to get good service engineering, where large quantities of methyl chloride are involved, and more-over adequate supervision may be lacking, it is considered, in general, ill advised to use larger quantities of this refrigerant.

The properties of methyl chloride are such that it approaches the ideal refrigerant almost as closely as any other. Its properties are excellent for use in refrigerating machines as about twenty years of practice has demonstrated. No attempt will be made in this article to go into the thermodynamic properties of methyl chloride, since this is beside the point. These properties have all been dealt with adequately in other publications.

Explosion and Flammability Hazard

The Underwriters' Laboratories Report classes methyl chloride as having moderate flammability and a moderate explosion hazard. The limits of flammability or explosion range given are 8.1 to 17.2% by volume (10.7 to 22.7 lbs. per 1000 cu. ft.).

It is a rather difficult matter to light methyl chloride as it issues from a cylinder and to keep it lighted. It is not as flammable as ammonia and not nearly as flammable as gasoline. The possibility of an explosion is something that has to be kept in mind where conditions are such as to permit an explosion. It should be borne in mind that an explosive or flammable mixture of methyl chloride requires quite a considerable concentration. As indicated above, the lower limits run something over 10 lbs. per 1000 cu. ft. which means that a fair quantity must be present in a particular area in order to develop an explosion, provided some means of ignition is present.

There are recorded instances of explosions of methyl chloride as well as ignitions of this refrigerant where little or no explosion occurred. However, these explosions and ignitions are not common despite the fact that a very large number of machines using methyl chloride have been in operation for many years. Since it takes a comparatively large quantity to produce an explosion, we should not expect many to occur. The general record indicates but few explosions. However, when such an explosion does occur, a large amount of publicity is given to it, quite largely because of its oddity. In a recent case in Memphis one death resulted from the ignition of methyl chloride. In this case, the accident would never have happened had consideration been given warnings and instructions relative to the change-over of the machine from "Freon 12".

Adequate ventilation is very important in eliminating hazards which might result from an explosion or ignition of methyl chloride. Ventilation by means of windows or doors (unless they are secured so as to remain permanently open) is not at all satisfactory. A basement or other closed area should be equipped with an exhaust fan and an outlet for fresh air, so located as to create a strong cross ventilation.

Health Hazard

Methyl chloride is toxic provided exposure is made to certain specific amounts for correspondingly definite periods of time. Table

I is taken from the U. S. Public Health Bulletin No. 185, March, 1929.

TABLE I—EFFECT OF VARIOUS CONCENTRATIONS OF METHYL CHLORIDE

	% by volume in air	Lbs. per 1000 cu. ft. at 27.1° C. (70° F)
Dangerous 30-60 minutes	2-4	2.6 -5.2
Maximum amount for 60 minutes without serious disturbances	0.7	0.92
Slight symptoms after several hours or maximum amount for prolonged exposure	0.05-0.10	0.066-0.132

The Underwriters' Laboratories Report states "Methyl Chloride is an anesthetic." "It will be noted there is a definitely delayed toxic action in the case of methyl chloride.

As indicated, from the standpoint of health hazard, there are two things to watch out for where exposures have occurred to methyl chloride. The first is the drowsiness inducing effect, that is, the anesthetic effect; the other is the more important after effect. In many respects, it is really unfortunate that methyl chloride has such a pleasant odor, for there is no strong warning of the presence of excessive concentrations such as exists in the case of sulphur dioxide.

There is too much of a tendency to assume that methyl chloride will not harm and consequently many servicemen take undue chances with it. A definite relationship exists between the possible hazard arising from toxicity due to methyl chloride and the amount of this refrigerant escaping, the area into which it escapes, the amount removed by ventilation, and the time of the exposure of the individual. If exposure is for a very short time, then a larger amount of methyl chloride can be stood without serious effects. However, longer exposure to somewhat smaller amounts will result in a hazard.

Adequate Ventilation Necessary

Where a toxic concentration is suspected, adequate ventilation must be provided before entering the area. In some instances the use of a gas mask will obviate this ventilation although it should be pointed out that the cannister-type gas mask is unsafe for a large concentration of methyl chloride, due to the reduction of the oxygen content of the air. Since it is unlikely that all servicemen will be provided with proper masks, and will use them, good ventilation must be maintained and it is a prime requisite.

As pointed out above, the first indication

of the development of hazard due to exposure to methyl chloride is the production of drowsiness. In the event this symptom shows up the person should get out of the area containing methyl chloride just as rapidly as possible. Most of the concentrations the average service engineer gets into are concentrations of which he is well aware, but he feels so certain he can take methyl chloride without any ill results that he is not very careful about it.

Virtually every accident involving methyl chloride could be avoided if carelessness of this type could be eliminated. There are of course other types of accidents in which persons other than servicemen have been involved. Most of these are associated with installations in which excessively large quantities of methyl chloride are permitted. The use of acrolein or other warning agents is advocated in certain cities.

Exposure to excessive concentrations of methyl chloride above the minimum time results in an attack similar to alcohol intoxication, with the characteristic symptoms of drowsiness, mental confusion, nausea and possible vomiting. In the event a man is overcome, he should be removed to fresh air and a doctor called. The after effects are due to a break down of this chemical in the body. These after effects are similar to those of methyl alcohol poisoning.

Adequate ventilation is a prime requisite and will eliminate hazards due to toxicity.

Aluminum and Methyl Chloride

Methyl chloride can not be used in a machine which contains aluminum. This is due to the fact that it reacts with aluminum to form two chemical compounds which are spontaneously flammable in the air. These compounds do not burn inside the machine unless air gets in it and consequently their presence is noted only when a leak develops in the machine and the refrigerant, containing the flammable compounds, escapes into the air. The hazard associated with the use of methyl chloride in machines having aluminum parts can be a very real one, especially if aluminum is used as a gasket material.

In the case of the accident occurring in Memphis some time ago, an aluminum gasket was at fault in that it was attacked by the methyl chloride, producing a leak through which the refrigerant escaped very rapidly, together with most of the oil from the machine. This apparently produced an explosive mixture in the room which was ignited,

(Continued on page 40)

Pipe and Tube Bending

This concludes the article taken from the handbook on Pipe and Tube Bending, issued by the Copper and Brass Research Association. Complete copies are available upon request from the Copper and Brass Research Association, 420 Lexington Ave., New York 17, N. Y.

Smoothing Puckers in Rosin-Filled Pipe with Bumping Bar

Puckers in rosin-filled seamless pipe with diameters over 7 in. and sharp radii are smoothed with bumping bars after melting out the rosin. Fig. 5 shows a U-bend with radius of one diameter worked by this method. The stretchout of the bend is marked on the pipe from a wire templet. The marked section is then bent to the first stage A, which should be about 60 deg. After melting out the rosin, the puckers are beaten out from the inside with a bumping bar shaped to suit the radius. The work must be kept red hot while bumping, as the stroke and force of the blows with the bumping bar is limited by the diameter of the pipe. After roughing out the puckers, the pipe is rounded and smoothed on a ball, then annealed and re-filled with rosin for bending to the next stage B. After bending to about 120 deg. the bend is again smoothed and prepared for the final stage by following the procedure outlined in the foregoing. Hot working is done best with the pipe resting in a bed of loam.

While bending the last stage, the throat space will become too small for entrance

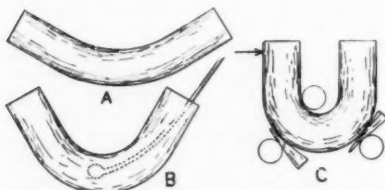


Fig. 5—Bending large diameters.

of the movable block of the bending press. When this point is reached, the bend is secured to the table with pins and wood wedges and finished by pushing the ends in with the bending block as shown by the arrow in C. If a very smooth finish is wanted, the pipe is again filled with rosin after the final shaping with the bar and planished.

Loss in Thickness Due to Bending

The foregoing is an extreme example of copper pipe bending, the linear measurement of the back center being nearly three times that of the throat center in the finished bend. The thickness loss in the back will be about 25 per cent. This relatively small loss is accounted for by some of the metal in the straight ends being drawn into the bend. On large diameter pipe this drawing effect in the back is noticeable 2 ft. from the bend. The throat thickness is increased considerably, due to the repeated smoothing of puckers and rounding. The bore of the bend will tend to enlarge through the same cause, but this is rather an advantage.

Large diameter seamless pipe bends requiring over two stages of bending are seldom made as the cost is greater than for bends made by forming and brazing sheets.

Bending Pipe with Brazed Seams

Pipes with brazed seams must be bent with rosin filling. Sand filling is precluded, as the seam cannot stand hot-bending. Dove-tailing clamps should not be cut in the radius as cracks are almost sure to develop in the cuts. The pipe is placed for bending so the seam will be on a side wall with the outside lap edge of the seam facing toward

the back. This is the most desirable location for the seams, as less stress is developed at this point while bending. However, they cannot always be placed thus when compound bends on different planes are required. In these cases the seams are placed so as to undergo the minimum stress, the aim being to place them as close to the side walls as possible. As a rule, seams in made-up copper pipes that are to be bent are not dovetailed.

Bending with Low-Temperature-Melting Alloy Filler

The use of a metal filler, which melts readily in hot water has certain advantages over rosin, sand, lead and other methods used to support thin wall tubes during the bending process. Clean removal of rosin and lead is difficult and the use of either of these materials may affect the temper of the tube. Their relatively high melting temperatures preclude their use for light alloy tubes. Sand is difficult to pack tightly to give sufficient support to thin wall tubes.

The objections mentioned above are eliminated when using a low-temperature-melting alloy filler, such as Cerrobend* (Woods Metal), the advantages of which may be listed as follows: Low pouring and remelting temperature does not affect the temper or finish of tubes made of any metal; easy and safe to handle; can be used repeatedly without appreciable deterioration; insures accurate and uniform bends; complete removal in boiling water leaves tubes clean.

The low-temperature-melting alloy referred to is a mixture of bismuth, lead, tin and cadmium. Its melting temperature is 158 deg. F. Above this temperature it is extremely fluid. A slight expansion occurs during and after solidification, which insures a tight fit between the filler and the tube. Other physical properties are:

Tensile strength5990 lbs./sq. in.
Elongation in 2 in.	...140% to 200%
Brinell Hardness9.2
Weight per cubic inch339 lbs.
The weight of filler per foot of tube for various inside diameters is as follows:	
1/4 in.22 lbs. 1 in. 3.2 lbs.
3/8 in.47 lbs. 1 1/8 in. 4.2 lbs.
1/2 in.88 lbs. 1 1/4 in. 5.1 lbs.
5/8 in.	1.3 lbs. 1 1/2 in. 7.4 lbs.
3/4 in.	1.8 lbs. 1 3/4 in. 10. lbs.
7/8 in.	2.5 lbs. 2 in. 13. lbs.

* Cerrobend is a product of Cerro de Pasco Copper Corporation, New York, N. Y.

Method of Using

1. Make sure that tube is fully annealed.
2. Clean interior of tube with pull-through to remove any scale or foreign matter.
3. Tightly plug one end of tube with wood or rubber plug.
4. Fill tube with a light grade oil, preferably S.A.E. 10.
5. Pour oil from tube leaving about a tablespoonful in the bottom of the tube. Careful attention to oiling is necessary to prevent the alloy "tinning" the tube.
6. Fill tube with the alloy from an iron ladle or a welded stainless steel container suspended in boiling water or hot water jacketed stainless steel tank, allowing the alloy to run down the side of tube in order to avoid air pockets. Small tubes (1/4 in. dia. or smaller) should be placed in boiling water, while being filled.
7. Lower loaded tube immediately into cold circulating water quenching tank and leave for sufficient time for tube and filler to attain room temperature throughout (about 15 minutes for 1 in. dia. tubing, 20 minutes for 1 1/2 in. dia. tubing, etc.).
8. After proper quenching, rewarm loaded tube to about body temperature.
9. Remove plug from tube.
10. Bend loaded tube with a slow uniform pressure over a forming block or in a regular bending machine.
11. Immerse bent tube in boiling water tank (stainless steel preferred) and allow the alloy to run out. (Do not use torch.) Tilt and shake tube as necessary to remove alloy as completely as possible.
12. Plunge unloaded tube while still hot in cold water for two minutes to solidify any small drops of the alloy retained in the oil film.
13. Flush tube with a cold grease solvent to remove oil film and any solid particles of the alloy. Additional cleaning may be done with a tight fitting pull-through.

IMPORTANT: Satisfactory results depend entirely on rapid quenching and thorough cooling, rewarming before bending, and using a slow uniform pressure during the forming operation.

(Rustless iron or stainless steel are recommended for tank construction. Plain steel will rust when in constant contact with boiling water and steam. Copper, aluminum and galvanized iron tanks will contaminate the alloy.) See Fig. 6.

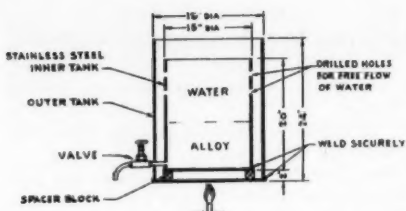


Fig. 6—Double boiler type Melting Tank for alloy filler.

Bending with Salt Filler

It has been found that common table salt is a good material for use as a filler. It is easily compacted in the pipe and furnishes a rigid core. Salt has an additional advantage over other granular materials in that it can easily be dissolved out with water, should that become necessary. It is cheap and so widely distributed that it may often be more easily available for the purpose than sand. Salt by its very nature, if sufficiently granular to run freely in the filling of the tube, is free from all traces of moisture and is therefore unaffected by the heat used.

PIPE AND TUBE BENDING METHODS AND DEVICES

The equipment used for bending may be merely a simple hand-operated fixture or a power-driven pipe-bending machine, the apparatus used depending upon the size of the work and the amount of bending to be done. Some of the bending fixtures are special and intended for making a certain bend or combination of bends in duplicate pipes, whereas other fixtures are designed for general application. Pipe- and tube-bending machines are also designed in some instances for special work, and in others for general application, although machines of the latter class require more or less special equipment, such as bending forms or rolls of the required radius. After giving some general rules for determining bending allowances and the permissible bending radius for a pipe of given diameter, various classes of pipe- and tube-bending apparatus will be described and illustrated by means of simple diagrams that represent particularly the important features of the bending mechanisms and the principle governing their action.

Rules for Finding Lengths of Bends

In determining the required length of a pipe or tube before bending, the lengths of the straight sections are, of course, added to the lengths of the curved sections in order to make the proper allowance for bends. The following rules may be used for finding the lengths of the curved sections.

Rule: To find the length of a 90-degree or right-angle bend, multiply the radius of the bend by 1.57 (the radius is measured to the center of the pipe).

Rule: To find the length of a 180-degree or U bend, multiply the radius of the bend by 3.14.

Example: A right-angle or 90-degree bend is to have a radius of 10 inches and straight sections on each side of the bend of 5 and 15 inches, respectively. Find the total length of the pipe before bending. Length of curved part = $1.57 \times 10 = 15.7$ inches; hence total length = $15.7 + 5 + 15 = 35.7$ inches.

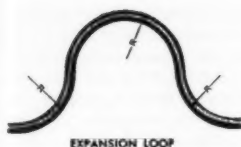
A general rule for finding the lengths of sections having degrees of curvature other than 90 and 180 is as follows: Multiply the radius of the bend by the included angle, in degrees and then multiply the product by the constant 0.0175. The result is the length of the curved section.

To prevent flattening at the ends there should be a straight section adjoining the bend equal at least to the pipe diameter or to $1\frac{1}{2}$ times the diameter for pipes larger than 10 inches.

Rule for Safe Minimum Radius

Pipes are often bent to avoid the use of fittings, thus eliminating joints, providing a smooth unobstructed passage for fluids, and resulting in certain other advantages. Read last paragraph page 40. Sometimes it is desirable to make the radius of the bend as small as possible without causing distortion, whereas on other classes of work, the radius may be comparatively large, as, for example, when pipes are curved to provide means of compensating for expansion and contraction in a line of piping. (See Fig. 7 for example.)

The safe minimum radius for a given diameter, material, and method of bending depends upon the thickness of the pipe wall, it being possible, for example, to bend extra heavy pipe to a small radius than pipe of standard weight. The minimum radius for standard weight pipe should, as a rule, be



EXPANSION LOOP

Pipe Size	RADIUS—R									
	FOR TRAVEL OF									
	1/2"	1"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	
3/4	10	15	19	22	25	27	30	34	38	
1	11	16	20	24	27	29	33	38	42	
1 1/4	11	17	21	26	29	32	36	42	47	
1 1/2	12	18	23	28	31	35	39	46	51	
2	14	20	25	31	34	38	44	51	57	
2 1/2	16	22	27	32	37	42	47	56	62	
3	18	24	30	34	39	45	53	60	67	
4	20	28	34	39	44	48	58	66	75	
5	22	31	39	44	49	54	62	70	78	
6	24	34	42	48	54	59	68	76	83	

Bends to left of heavy line can be made from 20' or less of pipe.
All bends made from type K pipe.
Bends requiring more than 20' pipe are made in sections and assembled with couplings or flanges.

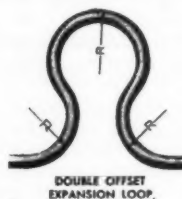


FIG. 7.

three and one-half to four times the diameter. It will be understood, however, that the minimum radius may vary considerably, depending upon the type of extra fixture or machine used for bending. Extra heavy pipe may be bent to radii varying from two and one-half times the diameter for smaller sizes to three and one-half to four times the diameter for larger sizes.

Location of Seam in Butt-Welded Pipe

Whenever a pipe or tube is bent, the outer fibers of the curved section are stretched and the inner fibers are compressed, and between these sections that are subjected to tension and compression there is a neutral axis located about midway between the inner and outer curves. Therefore, it is generally considered good practice to locate the seam in butt-welded pipe along this neutral axis or section, in order to lessen the danger of rupture or

cracking. However, if the bend is made by heating the pipe and then cooling the outer part of the curve, so that the bending is the result principally of compression, the seam, according to at least one experienced manufacturer, should be along the outer curve.

Pipe- and Tube-Bending Fixtures

Many small pipes and tubes are bent by using hand-operated fixtures which are so arranged that the force for bending is obtained from a direct-acting hand-lever provided with a bending or forming roll. For pipes or tubes of larger sizes, the common practice is to use either a hand-operated or a power-driven machine equipped with reduction gearing, or possibly a toggle mechanism to multiply the power for the bending operation. These special fixtures and machines ordinarily are used for bending pipes and tubes without heating them. Several hand-operated fixtures will be described first.

Pipes with small diameters or heavy walls can be bent empty by means of forms and rolls. The grooved wheel and bar arrangement shown in Fig. 8 is used for bending pipe 0.065 in. or more in thickness and up to 1 1/4 in. diameter. The minimum radius for empty bending by this method is about 2 times the diameter of pipe for standard pipe sizes, and 3 times the diameter for lighter gages. Pipes for sharper radii must be filled before bending.

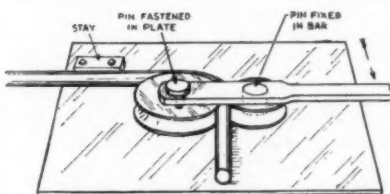


Fig. 8—Bending rolls.

The groove in the wheels should be a close fit on the pipe. It is good practice to have the rims of the groove extend 1/8 in. over the center line of the pipes, thus confining the side walls of the pipes at all times during bending. The pins in the plate and bar are the same diameter (about 1 3/4 in.) thus making the large and small wheels interchangeable, thereby giving the choice of two radii. The stationary wheel on the plate pin, around which the pipe is bent,

should be kept from turning by keying to the pin, or by a staple through wheel and plate, to prevent dragging the pipe in the stay while bending. The movable wheel on the bar should turn freely. The bar pin and top of the plate pin are greased to overcome friction.

Fig. 9 shows an arrangement of the wheels wherein the stay is bolted on the bar, both wheels turning on plate pins. This set-up is satisfactory for heavy copper and brass pipe, as somewhat less force is required for bending. It is unsuitable for light-gage pipe as the stay will indent the pipe.

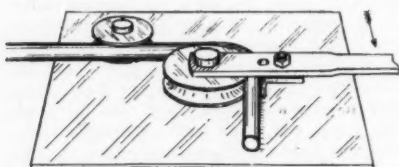


Fig. 9—Bar stay bending rolls.

There are power pipe bending devices on the market for larger diameters which use the above grooved wheel principle, some involving the use of internal dies in the pipes to prevent wall collapse while bending. Copper pipes can also be bent with three grooved power operated rolls, the operating principle being the same as the familiar plate roll.

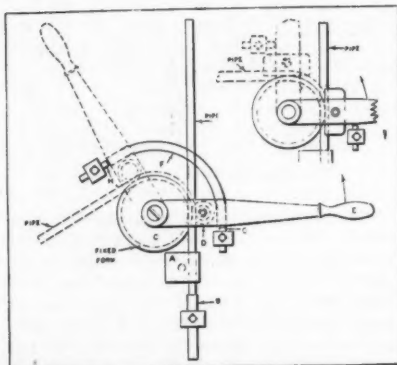


Fig. 10—Pipe bending fixture having a fixed form and a rotating formed roll (detail view). Forming roll replaced by straight forming block.

A simple type of fixture is shown in Fig. 10. The pipe or tube to be bent is held at one end by clamp A, which may have a spring located in a counter-bored hole to hold it open when the clamping nut is released. Stop B serves to locate the pipe so that the bend will be made at the right place. The pipe is bent around the fixed form C, which has the radius of the desired bend and is grooved to fit the pipe. The bending or forming roll D, which is pivoted to hand-lever E, is also grooved to fit the pipe so that the latter is almost completely enclosed along the center line between C and D. Hand-lever E has a supporting pad or runway F, which holds roll D in alignment with form C. The movements of the hand-lever are limited by stops G and H.

Instead of using a circular roll for bending the pipe about the fixed form, a straight grooved block may be pivoted to the hand-lever, as indicated by the diagram in the upper right-hand corner of the illustration. This straight bending block comes into contact with a larger surface and is sometimes preferred to the roll.

Mandrel Inside of Tube to Prevent Distortion

For certain classes of pipe and tube bending, some form of internal mandrel is used so that the pipe or tube is supported both externally and internally in order to prevent flattening. Internal mandrels are used particularly in connection with the bending of thin tubing. The mandrel may be in the form of a plain cylindrical bar that fits closely inside the tube, or it may be of special form as described later. A plain mandrel is shown at A, Fig. 11, in conjunction with a simple hand-operated fixture. The tube to be bent is pushed over the end

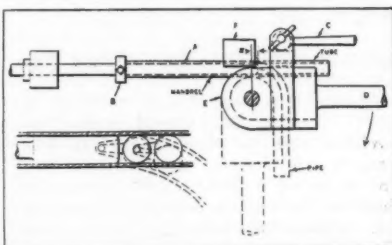


Fig. 11—Rotating form and solid mandrel over which pipe is drawn (detail view). Ball type of mandrel used for some tube-bending operations.

of the close-fitting mandrel and against stop B, which is set to locate the bend relative to the straight portion. The tube is clamped in place by lever C, and it is bent by pulling lever D in the direction indicated by the arrow, which causes form E to rotate about its bearing. This form is, of course, grooved to suit both the radius of the pipe and the radius of the bend, and the pipe is additionally supported by a backing block F, which is also grooved and is so located that there is practically no clearance space when the tube is in place.

The arbor should be lubricated to reduce friction as the pipe is drawn off the mandrel in making the bend. The mandrel should project a certain distance X beyond the center line in order to support the pipe to the best advantage. This distance, as well as the amount of curvatures at the end of the mandrel, may be determined by experiment.

Inner Mandrel with Formed Head

Fig. 12 shows a mandrel that has a formed end to fit the curved section of the pipe and provide a larger supporting surface. The fixture otherwise is quite similar to the one just described. There is a stop B, a backing block F, and a clamp C, the same as in the fixture previously described. The detailed view in the upper right-hand corner shows more clearly the shape of the mandrel. This end may be finished to the right curvature by using a forming tool having a radius equal to the inside radius of the pipe. The mandrel is held in a lathe chuck and the tool in the toolpost. The end is then formed by swinging the tool while the work is held stationery, the swinging movement being obtained by loosening the swivel of the tool-slide. It will be understood that the tool must be located at a

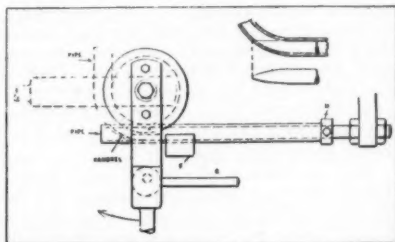


Fig. 12—Rotating form and mandrel having formed end to increase supporting area inside pipe.

distance from the axis of the swivel equal to the radius of the desired bend.

The ball type of mandrel illustrated by the enlarged detail view, Fig. 11, has been used for many tube-bending operations. These balls are so connected that they have a limited amount of movement, and they partially support the curved section of the tube, as indicated by the dotted lines. This general type of mandrel has been used both on hand-operated fixtures and on power-driven pipe- and tube-bending machines.

§ § §

REFRIGERATION UNIT USED FOR PARACHUTE DRYING

A SELF-CONTAINED mechanical drying unit—a standard refrigeration system used for dehumidification only—was built recently for use in keeping parachutes in the proper condition. The unit is now in use at a base in a semi-tropical climate in a room where the parachutes are periodically shaken out, or "fluffed," in order to keep them free from mildew, creases and excessive moisture content.

As the dry bulb temperature is of no consequence in this installation, the open unit is placed within the room with no provision for exhausting condenser air or supplying outdoor air. It will, in effect, lift itself by its own boot straps. It is estimated that the dry bulb temperature will balance at 100° F., and the humidity will be maintained between the limits of 40 per cent to 60 per cent. This requires moisture precipitation at the rate of 3.2 lbs. an hour. On test, and under design conditions, the unit precipitated four pounds per hour.

The unit is composed of a General Electric CM-68B air cooled condensing unit, 3-hp. and an EC-181 conditioned air cooling unit, both standard units now in common use in commercial and industrial refrigeration applications, together with necessary controls. The unit was designed and sold by the Refrigeration Dept. of the International General Electric Co., New York City.

§ § §

The American Red Cross maintains a staff of trained workers to aid service men's families in trouble. This and other services to members of our armed forces and their families can be continued only with your help. Give to the 1944 Red Cross War Fund.

News Briefs on War Regulations

Restrictions on Freon Continued

RESTRICTIONS on the use of F-12 Gas "Freon" in refrigeration and air conditioning systems, have been continued until August 31, 1944, it was announced by the War Production Board, January 19.

Originally the restrictions on the use of this gas were scheduled to be lifted on March 31, 1944. However, delays in the construction and operation of the new plant of Kinetic Chemicals, Inc., the only producer, at Deep Water, N. J., and an estimated shortage in the supply of anhydrous hydrofluoric acid which is used in the production of Freon, make the extension of restrictions necessary.

In thus continuing its strict controls over Freon Gas, the War Production Board is endeavoring to provide a continuously available supply for use in the new Aerosol Insecticide "bombs" now being used with such outstanding effectiveness by the invaders of New Britain and in other mosquito-infested areas of the South Pacific. Additionally, the WPB has to conserve all possible stocks for use in air conditioning and refrigeration systems of naval vessels and other essential war and production uses.

Those types of businesses and services which are prohibited from acquiring or using any new Freon remain the same as in the original order.

Exemptions to these restrictions include small systems using less than 10 pounds of Freon and utilized to store Penicillin, blood plasma and drugs. Also certain cold storage systems where a change to other refrigerants, mainly methyl chloride, is not possible due to particular construction of the system. The extension of these restrictions is contained in an amendment to Conservation Order M-28.

Copper Tubing Available for Repairmen

AMETHOD by which copper tubing may be made available for use of repairmen in repairing refrigeration, gas and oil burner, and automotive equipment, through normal distribution channels, has been established, the War Production Board announced January 17.

The procedure which is provided in Direction No. 1 to CMP Regulation No. 9A, makes copper tubing available to established distributors for sale to persons engaged in the business of repairing refrigeration, oil and gas burner, and automotive equipment.

Distributors who were in business on August 1, 1943, and who in 1941 sold copper tubing to repairmen for repairing such equipment are eligible to obtain up to 6,000 pounds of copper tubing each Calendar quarter by placing on their purchase orders for it (1) the CMP allotment number "V-3" and, (2) the certification contained in CMP Regulation No. 7, as follows—

The undersigned purchaser certifies, subject to the penalties of Section 35 (A) of the United States Criminal Code, to the seller and to the War Production Board, that, to the best of his knowledge and belief, the undersigned is authorized under applicable War Production Board regulations or orders to place this delivery order, to receive the item(s) ordered for the purpose for which ordered, and to use any preference rating or allotment number or symbol which the undersigned has placed on this order.

Such an order is an authorized controlled material order and may be filled by producers of controlled materials. Distributors may sell copper tubing to refrigeration, oil and gas burner, and automotive equipment repairmen who place on their orders the following simple certification:

CMP Allotment Symbol V-3, Preference Rating AA-3. The undersigned purchaser certifies, subject to the penalties of Section 35 (A) of the United States Criminal Code, to the seller and to the War Production Board, that, to the best of his knowledge and belief, the undersigned is authorized under applicable War Production Board regulations or orders to place this delivery order, to receive the items ordered for the purpose for which ordered, and to use any preference rating or allotment number or symbol which the undersigned has placed on this order.

Such an order is an authorized controlled material order and may be filled by the warehouse upon whom it is served.

Any distributor who needs more copper tubing than he is eligible to obtain under the direction or who is not eligible to buy copper tubing under its terms for sale for repair purposes may apply by letter to the nearest WPB field office for authorization to buy the tubing he needs, stating, (1) how much cop-

per tubing he needs for resale, and (2) why he needs that amount. If he needs more than a total of 12,000 pounds, he should apply to the Copper Division, War Production Board, Washington 25, D. C., giving the same information.

No Promises on Civilian Production

THE date on which such important war industries as those which formerly produced domestic mechanical refrigerators and similar heavy consumer goods may resume civilian production cannot be determined now, Charles E. Wilson, executive vice chairman of the War Production Board, told members of the Domestic Mechanical Refrigerator Industry Advisory Committee.

"Our Army and Navy face what is probably the most perilous undertaking in military history," he emphasized. "Industry must be kept flexible, so that it will be able to meet the requirements for increased war production that may result from impending military operations. Until the outcome of what lies ahead becomes clear, and there is no way of telling when that will be, production of domestic mechanical refrigerators cannot be resumed.

"Materials are available, but labor cannot be assigned to turn these materials into refrigerators. Labor is already in short supply in many areas and within the next six months many men will be drafted out of industry."

Addressing the committee members in the same vein, Lemuel L. Boulware, Operations Vice Chairman of WPB, said that resumption of civilian production by the refrigerator industry is much farther away than has generally been supposed and that all that can be done in the interim is to explore the problems pertaining to an orderly transition from war to civilian production if and when the military situation will permit.

The transition period will be long and difficult, it was brought out in the meeting. It was estimated that the first domestic refrigerators will not come off the assembly lines until six or nine months after production is authorized.

The general problems discussed by the committee in this connection included those bearing on the minimum number of models and sizes of refrigerators that might be produced, minimum economic production runs, the expected need for new facilities to re-

place those now used in war production, bills of material, critical components, such as fractional horsepower motors, automatic controls, and Freon refrigerant, and the matter of plant locations with relation to labor supply.

Possible solutions to most of these problems cannot be arrived at until resumption of domestic mechanical refrigerator production is in sight. All the problems require further deliberation, the committee indicated.

SERVICE TRADES BULLETIN IS ISSUED ON REPAIR WORK

THE Department of Information, Office of Price Administration, has issued a service trades bulletin on repair of certain appliances and equipment. Included is a form for recording increase in service rates that will be helpful in figuring new customers' rates for appliance refrigeration service; also as a means of justifying new rates, if necessary. It is not, however, to be filed. Complete copies of the bulletin have been distributed to members of the Refrigeration Service Engineers Society and additional copies are available from the office of THE REFRIGERATION SERVICE ENGINEER.

DEALER VIOLATES CEILING PRICE

THE OPA is proceeding vigorously against violators of the ceiling price on refrigerators, as demonstrated in the case of Joseph Josephine, Fresno, Calif., furniture store operator, who was convicted on three counts of selling refrigerators above the ceiling price.

Josephine admitted in his appearance before Federal Judge C. E. Beaumont at Fresno that he had sold three over-price refrigerators, one for \$180 against a ceiling of \$95, another at \$90 against \$18, and the third for \$200 against the ceiling price of \$67.50. The defendant's original plea of *nolo contendere* was not accepted by the court, following which Josephine entered a guilty plea.

On the first count he was fined \$500 and on the other two was granted probation for one year. Judge Beaumont also ordered Josephine to refund to the purchasers of the refrigerators the difference between what he had charged and the ceiling price.

Service Pointers

Practical Service Men Tell How They Meet New Repair and Service Problems

UNDER this department a number of practical service men show a commendable cooperative spirit in passing on to others information on special repair and service problems that may be of much value in these trying times of material scarcity and shortage of competent help. We believe if more readers would send similar contributions, making **THE REFRIGERATION SERVICE ENGINEER** a medium for the exchange of information on service, much benefit would accrue to all. Similar contributions are solicited from all readers.

THE RHYTHM OF REFRIGERATOR NOISES

By M. G. Horwitz

THIS is in answer to C. W. who seeks "any information or suggestions" under the "Knock in Old Crosley" column, printed in the October issue of **REFRIGERATION SERVICE ENGINEER**. I hope this bit of information is helpful.

Some types of domestic refrigeration units as well as human beings seem to dissipate their lives away quicker than others. We have reached the point where upon entering a home to service as yet an unnamed make of refrigerator, we have heard that unmistakable tap-tap-tap of the Crosley pump.

Please do not misunderstand! We are referring to sick units only. In fact, come to think of it, isn't it queer that most different makes of pumps or units emit different types of sound, usually associated with that particular make and type of unit?

Aside to an oldtimer . . . (We are not discussing causes or remedies at this point but illnesses) . . . Have you ever heard the chatter of a Kelvinator check valve, the distinctive click of the Norge rollator, the monotonous fiddle-like strain of a Dayton pump seal, the far-off rumble and off-beat tap of a G. E. monitor type, the bell-like tinkle of a Kelvinator high side float, the quiet, kitten-like purr of most any new sealed unit and finally, the tap-tap-tap of a Crosley pump which, in the latter, we have found, is usually caused by a worn wristpin or high head pressure or both.

THE WOES OF A SERVICEMAN

He thinks he is through
And slumps to a chair
For an evening at home
With the family heir.

When all of a sudden the telephone rings
"Aw—cut the wires on that darn old thing."
But he's off his chair and down the street
He must see the butcher and save that meat.

He lights his torch—the search is on
Because he has found the gas is gone
He hunts 'round the nuts, the valve and the seal
Then patches that leak—it will never squeal.

Now he settles down to a serious search
For leaks above, below or behind,
For a trace of that gas you can't see or feel
For troubles he hopes he never will find.

He snoops around, but there's nothing there
And very content goes home to his chair.
Did you ever hear of a man of this kind
Who'll search for troubles he hopes never to find?

—M. J. BRAATEN

NEW USE FOR CAPILLARY TUBES

By Chas. Crane, Jr.

HERE is a new use for old defective Crosley Capillary Tubes. I take a 20 to 24-inch piece of old capillary tube and insert it into a piece of 1/4-inch tubing, soldering it in on top end leaving tube loose in bottom end and then flare both ends, then hook the soldered end to a gauge and it will stop compressor pulsations on the gauge and prolong its life, besides giv-

ing an accurate reading on the gauge. The capillary is cut shorter than the $\frac{3}{4}$ -inch tubing so you can make several flares without having to make a new line in case the flare leaks or breaks.

This is really a big help when servicing Norge or Cold Spot and will save a lot of broken gauges, for if one of these machines shut off with a gauge on low side it gives you time to shut off service valve before any damage is done to the gauge.

§ § §

MAKESHIFT REFRIGERATOR WORKS FOR SOLDIERS IN PACIFIC

EVEN in the remote spots in the Pacific, Uncle Sam's fighting men manage to devise means of refrigerating their food, judging by a letter received by New Hampshire relatives from Ensign Charles M. "Stubbie" Pearson, former Dartmouth athlete. Describing the refrigerator he wrote:

"Across from the table, we have an old refrigerator. Chuck found it and brought it in. He and a couple of Seabees worked on it and now it's running. The thermostat doesn't operate, so we pull the plug out whenever the box gets cold enough. Have it filled with beer, coca cola, fresh pineapple, cheese, jam, peanut butter, bananas, and an assortment of fruit juices."

REFRIGERATION EMPLOYED IN NEW TYPE OF HOSPITAL TRAIN

UNCLE SAM is now manufacturing new types of hospital trains and the first ones have already gone overseas. The trains, whose cars are slightly more than half the length of regular railroad cars, were designed to negotiate the sharp curves, narrow bridges and tunnels of foreign railways.

Refrigeration facilities are very excellent on this new type of train. An electro-mechanical refrigerator of 70 cu ft capacity is used to preserve food. The freezing unit will turn out 1920 ice cubes every 24 hours. One end of the kitchen car has been partitioned off for use as a pharmacy compartment which contains all drugs and medical supplies needed on the train.

§ § §

RICHMOND DEALER EXPANDS

LOOKING ahead to the post-war period, the Electric Refrigeration Service, 608 W. Broad St., Richmond, Va., where it has been located for the last nine years, is being moved into larger quarters at 8 W. Grace St., which has 4700 sq. ft. of floor space. The front part of the new location will be utilized as a display room for parts and for units after the war.

You'd better come right over. I believe I'm having some of those moisture troubles you were telling me about



How to Use Freon-22

By S. R. Hirsch*

NOTE: Commercial production of Freon 22 has been announced by Kinetic Chemicals, Inc., Wilmington, Del., and this refrigerant is now available generally to the refrigeration industry. The announcement states that this low temperature refrigerant is now available to those consumers who have already installed machinery in which it is the refrigerant, also those who, having sound engineering advice, desire to convert their low temperature apparatus to its use. It is not, at this time, under allocation by the War Production Board. Freon 22 formerly had been synthesized in a semi-works scale plant, but now a small commercial plant has been set up and the price reduced to less than half of the 1943 figure.

Following this announcement a number of inquiries have been received from readers as to whether "Freon-22" can be used in condensing units designed for use with "Freon-12." For the benefit of all those who are interested in this question the following information will be of interest.—Editors.

"FREON-22" (monochlorodifluoromethane) is another of the family of Freon refrigerants and, at atmospheric pressure, has a temperature of minus 41.4° F. as compared to "Freon-12" at minus 21° F. The attached table shows the pressure temperature relationship of "Freon-22" as compared to "Freon-12." An inspection of this table shows several things of interest which have a direct bearing upon the serviceability of the various condensing units for the application.

It is evident from the table that "Freon-22" is hardly recommended for air-cooled condensing units unless the amount of condenser service is large. This relationship is only present when low temperatures are used, because, with low suction pressures, the amount of gas delivered to the condenser is small and the relative condenser surface is, therefore, great. In general, it can be said that the condenser temperature is about 25-30° F. higher than the ambient air temperature for air-cooled units.

*Chief Engineer, Brunner Manufacturing Company.

TABLE I. PRESSURE TEMPERATURE CHART
(Figures above black lines indicate vacuum;
Figures below black lines indicate pressure.)

Temperature ° F.	"Freon-12"	"Freon-22"
-155	29.68	29.51
-150	29.61	29.39
-145	29.52	29.23
-140	29.4	29.04
-135	29.26	28.8
-130	29.08	28.51
-125	28.87	28.15
-120	28.61	27.72
-115	28.31	27.21
-110	27.94	26.61
-105	27.51	25.9
-100	27.01	25.06
-95	26.42	24.09
-90	25.74	22.96
-85	24.95	21.67
-80	24.05	20.18
-75	23.01	18.45
-70	21.84	16.55
-65	20.5	14.36
-60	19.0	11.89
-55	17.31	9.11
-50	15.48	6.02
-45	13.31	2.59
-40	10.96	.609
-35	8.34	2.691
-30	5.45	4.989
-25	2.2	7.517
-20	.6	10.292
-15	2.5	13.331
-10	4.5	16.644
-5	6.8	20.25
0	9.2	24.17
5	11.8	28.42
10	14.7	32.96
20	21.1	43.8
30	28.5	55.27
40	37.	69.02
50	46.7	84.7
60	57.7	102.5
70	70.1	122.5
80	84.1	145.
90	99.6	170.1
100	116.9	197.9
110	136.	228.7
120	157.1	262.6

If we have a 90° F. room, the condensing temperature will be about 120° F. which, for "Freon-12" would mean a head pressure of 157.1 lbs. gauge, whereas with "Freon-22" it would be 262.6 lbs. gauge. However, with low temperature units the differential between condensing temperature and ambient air temperature is less than 25 deg. and lower head pressures can be expected, which improves the working condition of the condensing unit.

In the case of water-cooled condensing units with a water temperature of approximately 75 deg. we can, by regulating the flow of water through the water valve, develop a condensing temperature of 100 deg. or less, and in such an instance, the condensing pressure with "Freon-22" will only be 197.9 lbs., which is acceptable practice. In most instances, the condensing pressure will probably be below 197.9 lbs.

Condenser Speed Reduced

A further study of "Freon-22" indicates that in order for it to be used in a condensing unit now using "Freon-12" the speed of the latter unit will have to be reduced about 38 per cent; otherwise, the motor will be overloaded. However, even with this 38 per cent reduction in speed, the capacity of the unit using "Freon-22" will be exactly the same as when "Freon-12" was used at the higher speed, because each pound of "Freon-22" has more cooling value than each pound of "Freon-12." It therefore follows that the amount of "Freon-22" in pounds, circulating through the system, is less than that of "Freon-12" and, consequently, a somewhat smaller expansion valve is necessary than is required with "Freon-12."

To clarify the above it must be remembered that most expansion valves are now rated in tons of refrigeration for certain pressure differences between the condenser pressure and the evaporator pressure. It would be our suggestion to divide the expansion valve capacity in tons by .7 and then select, from the particular manufacturers' catalog, the orifice size of valve for the required pressure difference. When "Freon-22" is used instead of "Freon-12," the system will require a smaller amount, but as it only represents a small percentage, it is not worthy of much consideration.

When "Freon-22" is used, a different pressure control is required. The pressure controls which we use on our units are

suitable for pressures of only 20 in. of vacuum to 50 lbs., and, as you will note from an inspection of the table showing temperature pressure chart for "Freon-22," the corresponding temperature at 50 lbs. is only about 25 deg., so that our present pressure control could not be used with "Freon-22" at temperatures above 25 deg. Where dual controls are used, i.e., either pressure or temperature controls with high pressure cut-out, they would have to be furnished with a heavier spring because the discharge pressure with "Freon-22" will be much higher than that at which the present high pressure cutout is usually set, which is about 175 lbs.

F-22 for Low Temperature

The fact must be appreciated that "Freon-22" was really developed for low temperature applications and not for commercial or high temperature applications. Even for low temperature applications, its use is preferred only at temperatures below minus 40 deg., although in some cases it might be used for temperatures beginning at minus 20 deg., because at corresponding pressures from minus 20 deg. and above, systems using "Freon-12" will operate on pressure, whereas "Freon-22" can operate on pressure all the way down to below minus 40 deg. Of course, below that we will have to go into the vacuum range even when using "Freon-22," but not as low a vacuum as with "Freon-12."

Under normal operation, for pressures not exceeding 200 lbs., we have no hesitancy in recommending any of the standard condensing units, modified as to speed, control, etc., as mentioned herein, for use with "Freon-22."

In some instances, it may be possible to use a smaller compressor but, at least for the present, all applications requiring a condensing unit with "Freon-22" should be referred to the manufacturer for his recommendation as to the proper unit. The manufacturers at the present time are handicapped in their regular production because of material shortages. Therefore, it might not be possible in all instances to make the special assembly which would be particularly adapted to the application.

§ § §

Hilding C. Anderson
Cold Spring, N. Y.

I have been a subscriber for a long time and like the magazine quite well.

It's Time to Tell About Refrigeration's Hidden Services



Service Engineer

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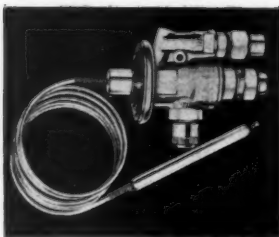
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DEPENDABLE

REFRIGERANT VALVES

The Question Box

Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment to "The Question Box."

COMMENTS ON QUESTION 582

QUESTION BOX: In the January issue of the REFRIGERATION SERVICE ENGINEER I noticed question 582 regarding a Super-Cold ice cream freezer and hardening cabinet which had clogged up.

I have had quite a lot of experience with low temperature units, and have run into the condition described. I found that the trouble was due to wax from the oil congealing in the coil and blocking it off entirely. On one cabinet I located the block in the coil by the break in the frost line, and cut this section of coil out, saved the material causing the plug, and had it analyzed proving it to be wax.

The remedy is to pump system down, blow the gas charge, clean the whole system out with carbon tetrachloride, and blow out with CO₂, drain oil from crank case, wash crank case out with carbon tetrachloride, and recharge with a good grade of oil, with a low cold test. This has never failed to do the job for me.

*Yours very truly,
E. H. Grocott.*

IMPROVISED FREEZER NOT COLD ENOUGH

QUESTION 584: I have a Frigidaire four-hole ice cream cabinet, using a 1/4 hp. Universal Cooler semi-hermetic unit. I have had quite a bit of difficulty in obtaining a sub-zero temperature, in fact the lowest temperature I have obtained is -4° F. I have checked the unit completely for efficiency and the unit will pull 28" vacuum on the low side and the discharge valve is holding properly. A month ago I was called out on this cabinet and found that all the gas charge was gone and some oil under the unit. In fact, I had to add oil to the unit before I could operate the machine as the compressor was so dry of oil that it would fairly squeal and almost blow the 15 amp. fuse in the circuit.

Is it possible that the oil has gone over into the plate and is slowing up the efficiency

of the machine, or is it impossible to pull a sub-zero temperature such as -8° or -10° F.? This cabinet is used for meat. I thought maybe the cabinet wasn't insulated enough for the quick freezing of meat and fowl, as ice cream, I believe, is stored at about 5° to 10° F. Will you kindly advise what you think is wrong? This unit is charged with 2 1/2 lbs. Freon, F-12. Suction pressure of 4 lbs.; head pressure at 90 lbs. per sq. in., using a capillary tube, which, by the way, was plugged a while back but after blowing it out with pressure is working satisfactorily.

ANSWER: It is quite probable that the Frigidaire ice cream cabinet has pumped oil over to the evaporator. Presumably if this oil is not under the machine or around the base, it must have gone somewhere, and therefore, must be in other parts of the system.

Furthermore, low temperature systems have more of a tendency to pump oil over to the low-side than the higher temperature systems, or to be more nearly correct, perhaps I should say that the low temperature systems have a tendency to hold the oil in the evaporator, because all systems will pump a certain amount of oil, but the higher temperature systems will return it more readily than the low temperature systems.

You have not indicated what type of metering device is used in this unit. If it is a low-side float, it may be that the float needs recalibrating in order to raise the liquid level to a point where the oil will be more readily returned. If it is a flooded system, such as a high-side float, low-side float or capillary tube, the system may be low on refrigerant.

Where there is insufficient refrigerant to fill the evaporator of a flooded system, oil will be held in the evaporator in greater quantities than when there is a full charge of refrigerant in it. Adding refrigerant at this time would force the oil to return to the compressor. If the compressor is pumping an excess amount of oil, and you find no way of forcing it to return, it may become necessary to install an oil separator between the compressor and the condenser.

NEHI BEVERAGE COOLER

QUESTION 585: I have a question in my mind and a service job that did not turn out so good as yet but expect to finish it in the near future as it's not needed right away. Here is the trouble and what I have done and the results.

The unit is a Kelvinator used in a Nehi beverage cooler, wet, using methyl chloride gas and an expansion valve thermostatic. The report was that it was not freezing. I put the gages on and found the following low-side about 10 lbs., the high-side about 105 lbs. but no results as to freezing or the valve frosting only sweating some. I then added gas at intervals until the head pressure raised some then quit without any freezing or frosting at the expansion valve, the low-side remaining the same. I had a new expansion valve so I put it on and this did not change things a bit.

I then shut off the low-side valve and the compressor pumped a 20" vacuum very quickly and held it but I did not let it stand very long. Then I tried the refrigeration again but no results, so then I shut off the high-side valve and the compressor built up a high head pressure until I shut it off, so now I am at a loss just now as to what to look for as to the cause of this trouble.

I had decided to tear the whole unit apart and check everything until I find the trouble unless I hear from you and that you can give me some help.

ANSWER: I am not able to determine definitely what the trouble is with the beverage cooler from the symptoms you have given me.

Apparently, the low-side and high-side pressures are about correct, and providing there is sufficient gas in the system, it should operate. There must be something more that you have not yet found, or some symptoms which you have not taken note of.

There are several possibilities of what could cause this trouble, such as air in the system, which gives you false indication of high head pressure, but actually there is a shortage of refrigerant in the system. Purging air from the high-side of the system, then adding gas, will quickly determine this point. Faulty valves in the compressor may also be a cause, and even though the compressor will pull a vacuum of 20 inches when the valves are shut off, the compressor may not be efficient to the point where it will handle a large enough volume of gas to do the work required of it.

It may be that either the suction valves or the discharge valves in the compressor are not seating properly, or are broken.

THE AUDIFFREN CONDENSING UNIT

QUESTION 586: Would appreciate it very much if the question box could give me information on the following described water cooling machine. It is an Audiffren refrigerating machine No. 4, made in New York City, contains 19½ lbs. SO₂ refrigerant, and has one ton capacity. It cools all the drinking water for the permanent hospital building at Fort Bragg.

It's about 12 years old and I never saw anything like it. The only moving part besides a circulating water pump is what is called a dumbbell, which turns half submerged in a tank of water. What I want to know is the principle of refrigeration used.

ANSWER: While we are not able to supply you with any descriptive matter on the Audiffren refrigerating machine, perhaps I can give you enough information in this letter to satisfy your curiosity, or to enable you to secure the information you require.

The Audiffren is credited with being the first hermetic unit ever constructed. Its history informs us that a Frenchman designed it in France. It was later brought to this country by a General Electric engineer and the General Electric Co. manufactured a few of them. Therefore, it is quite possible that you can obtain further information on it by writing the General Electric Co.

This unit employs a reciprocating compressor contained inside the bell, which is outside the water bath. It operates in effect like any reciprocating compressor in which the crankshaft would be held stationary and the compressor body revolves. In the Audiffren this is accomplished by using a heavy counterweight on the compressor body, which prevents it from turning, while the crankshaft turns with the dumbbell. Because of this arrangement, the dumbbell must turn very slowly, and where any attempt is made to speed it up, the centrifugal force will overcome the holding force of the counterweight, permitting the counterweight to swing around with the dumbbell and, of course, stopping the pumping action of the compressor.

I do not recall what type of metering device is used in this system, but it seems to me it was a high-side float. The end of the dumbbell submerged in the water is the evaporator.

NOISY MOTOR

QUESTION 587: I have been servicing a Kelvinator refrigerator, 5 cu. ft. box, high-side float, SO₂ and 1/6 hp. Delco motor. When called upon to service this refrigerator the first time, the motor had developed a clatter and got hot—almost too hot to touch. I checked the pressures and found them to be 90 lbs. head pressure, and operating on a 6-inch vacuum back pressure. Upon purging, I brought the pressure down to 75 lbs. head pressure. Upon checking the motor, I found it needed new mountings, which I cannot obtain, and a loose bearing on the pulley end. I took the motor to a motor repair shop where it was tested and nothing seemed to be wrong with it. Having put the motor back on the refrigerator, the box operated normal, but the motor still had that "clattering" sound, this "clatter" beginning about two or three minutes after the motor was running.

Again I took the motor off, and had a new bearing put on the pulley and at the same repair shop, but this still did not take the noise out of the motor.

In both instances when the motor was off the box, I temporarily installed two different motors. The first one I used was a 1/4 hp. Wagner (brush type) motor; with this motor the machine worked fine; the second motor I used was a Day-fan, alternating current, type SP-46. The first day it worked O.K.; the second day it blew out a 6 1/4 amp. fuse; I noticed on starting that the motor was not able to pull the load. The same evening it kicked-out the overload in the thermostat.

In the meantime I had a new switch installed in the original motor and installed the motor in the box; the same "clatter" developed as before, after the motor ran about two or three minutes. This "clatter" also interfered with radio reception.

Would you kindly inform me as to what is the reason for this "clatter" and what to do about it?

Is it possible to change a Day-fan motor over to a capacitor motor? If so, how can I do this?

ANSWER: I am of the opinion that the clatter in the Kelvinator motor is due to the deteriorated motor mountings. These mountings serve a double purpose of insulating the motor against noise carried through the machine, and to a large extent, against static charge which may be transmitted to the machine.

It is quite probable that the mountings

have cut through at one or more points so that the motor is rattling against the hold-down bolts. Furthermore, any static charge contained in the motor and generated by the belt would be released to the machine base each time the motor touched the bolt. This then would account for the radio interference.

It is difficult to obtain rubber mountings at this time, but I understand some men in the field have found it possible to devise makeshift mountings from worn out V-belts and other such material at hand. I am not acquainted with the manner in which it is done, but perhaps your ingenuity can solve the problem.

WARREN MEAT COUNTER

QUESTION 588: Please give me some information about a Warren meat counter refrigerator.

It is about seven feet long, four feet high and about three feet deep. It looks like a homemade cooling coil about 24"x24"x24" and hangs about five inches from top of case at one end. It does not have a blower of any kind inside. At the opposite end it has a tank about 8"x8"x24" and it has a 1/2 hp. motor and pump attached to it. It has two 5/8" pipes going in the bottom and two 5/8" pipes coming out the top. All of these pipes go into the refrigerator. The refrigerator floor has about 3/4" rise almost two-thirds of the length of the refrigerator.

What I want to know is: what kind of fluid is in this tank? What is it for? Should this pump run all the time; if not, at what times should it run? It has a switch on the pump motor on the side of the case. Should I put a blower fan by the cooling coil to give better circulation?

ANSWER: The Warren refrigerator you describe seems to be the only standard item in the entire hook-up, and apparently the coil you describe is a makeshift arrangement, while the tank has been added for some other purpose entirely unrelated to the refrigerating system itself. This tank could possibly have been used for cooling of some other product outside the refrigerator entirely.

In other words, it was possibly an auxiliary equipment circulating cool water or brine and getting its cooling from the refrigerator itself. It may also be a water cooler, where the water is circulated through the tank to a fountain, or some other source outside the refrigerator. What this tank contains is be-

(Continued on page 42)

Army Cold Storage Plant Enlarged

CAMP BLANDING'S CS-3 (three unit cold storage plant), one of the largest of its kind in the entire system of Army training camps throughout the country, has just been expanded with the addition of a vegetable storage room to the No. 3 Plant. The expansion cost was approximately \$40,000.

The original plant was built two and a half years ago by the Florida Weather Makers, Jacksonville, Fla.; and has a total storage capacity of 65,000 square feet. Each of the three plants is identical and have just been remodeled so that the refrigeration is controlled by a selector switch rather than a pressure starter as formerly.

Each plant includes the following equipment: two 7 G 8—50 H.P. Carrier compressors and one 7 G 8—40 H.P. Carrier compressor. These compressors are connected to two 9 Q 6—144 and one 9 Q 7—144 carrier evaporative condensers. The 9 Q 6 are connected to the 50 horsepower machines and the 9 Q 7 is connected to the 40 horsepower machines. These machines are controlled by M-H thermostats and selector switches. The first compressor starts after 25 per cent of the total refrigeration demand exists and stops when less than 25 per cent exists. The Hubbell capacity reduction valve operates when less than 30 per cent of the total refrigeration demand exists and does not operate when the demand is in excess of this figure.

The second compressor starts after 50 per cent of the total refrigeration demand exists and stops when less than 50 per cent demand exists. The Hubbell capacity reduction valve of the second compressor operates when less than 80 per cent of the total refrigeration demand exists and does not operate when the demand is in excess of 80 per cent.

These capacity reduction devices are also operated from the M-H selector switch. The 7 G 8—500 compressors are pulled by 50 H.P. Wagner electric motors and the 7 G 8—400 compressors by 40 horsepower Wagner motors. The motors are controlled by C-H Starter switches and relays. Dayton V. belts are used throughout the plants both on compressor motors and cold diffuser fan motors.

In each plant the No. 1 rooms maintain an average temperature of 10 degrees fahrenheit and are used for meat storage and other frozen products. These rooms have the following equipment: four Carrier model 15 Q 7 cold diffusers, two M-H thermostat controls. All cold diffusers are equipped with Alco Magnetic Solenoid valves and Alco thermostatic expansion valves.

The No. 2 rooms maintain an average temperature of 36 degrees fahrenheit and are used principally as issue rooms. They are equipped with two Carrier No. 15 Q 7 cold diffusers, one M-H thermostat and Alco valves.

No. 3 rooms have a temperature of 30 degrees fahrenheit and are used to store dairy products. Each is equipped with Carrier cold diffusers No. 15 Q 2 and Alco valves but are controlled by the thermostat in the No. 2 rooms.

No. 4 rooms are equipped with two Carrier cold diffusers No. 15 Q 7, Alco valves and M-H thermostat and are used chiefly for egg storage. A temperature of 38 degrees fahrenheit is maintained in the No. 4 rooms.

The new addition to Cold Storage Plant No. 3 is a room to be used to store vegetables only. This room is equipped with a Carrier cold diffuser, has an M-H thermostat, Detroit Magnetic Solenoid Valve No. 688-B and a Detroit Thermostatic Expansion valve No. 786. Blaisdell centrifugal direct connected water pumps are installed and the water pump motors and cold diffuser motors are controlled by C-H relay starters as are the condenser fan motors.

Records are kept of all compressor pressures and all room temperatures in the plants. American Recorder instruments are used for this purpose.

Eight refrigeration experts man the Blanding cold storage installation, all residents of Florida. They are L. M. Johnston, superintendent of refrigeration, Green Cove Springs, Fla.; J. G. Davidson, head operator, Lawtey, Fla.; D. S. Rhoades, head operator, Jacksonville, Fla.; A. G. Pope, head operator, Hampton, Fla.; L. B. Jordan, head operator, Starke, Fla.; W. S. Bissell, operator, Starke, Fla.; N. H. Prevatt, operator, Bronson, Fla.; and J. W. Willard, operator, Starke, Fla.

National Training Plan Reports Progress

AN ANNOUNCEMENT from the Administrative Office of the National Refrigeration Manpower and Training Program says it is important that the refrigeration service industry throughout the United States know that the National Program can continue indefinitely. Classes for new workers may be started in each community at any time the council members can supply the minimum of ten trainees and an instructor to the local vocational school. For example: a local council in a community may start a class of twelve, the next week other council members may select enough trainees to start another class of eleven. In a short period of time additional trainees may be hired by council members and another class started. This may continue throughout spring, summer and fall if the need is evident and the council members select and employ the trainees.

Training Course Flexible

The training courses are also flexible in that one contractor may wish to hire a total of six men, but may hire two trainees who will enroll in the first class, hire and enroll two more two or three weeks later and the remaining two may be hired and enrolled another month later.

These courses may continue throughout the entire year. This is possible as the class room training is done in the evening, and since the majority of these trainees will not be acquainted enough with refrigeration work to put in the overtime that will be required of the experienced repairmen.

Local Councils Organize

The Cleveland Refrigeration Council has been formed in accordance with the National Plan. A constitution has been adopted, officers appointed, and committees selected. The U. S. Department of Education, the War Manpower Commission, and the U. S. Employment Service have been contacted by these committees, and at a meeting January 11, the members of the local council requested fifty-eight trainees for the first section of the training course. Arrangements were made with the U. S. Department of Education to start the first

four classes the last week in January. Each class is limited to a maximum of fifteen trainees.

The U. S. Employment Service is cooperating with the local council in obtaining these trainees by advertising, by radio, and newspaper. Mr. Strunk of the Cleveland Electric League has acted as temporary coordinator, and has been selected by the local council as permanent coordinator.

Minneapolis, Minn., is the second to report the organization of the local Emergency Refrigeration Council in accordance with the National program. They, too, have adopted a constitution, elected their officers, and have appointed their committees. Hartford, Conn., is third in line on the organization of the local Emergency Refrigeration Council.

§ § §

REFRIGERATION SERVICE MEN RETURN TO JOBS

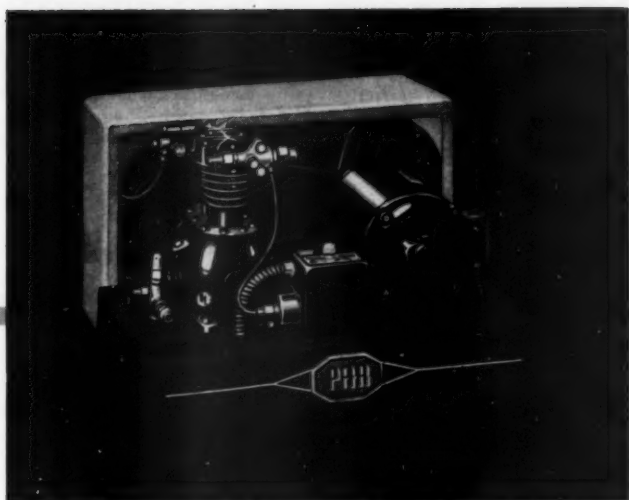
EXPERIENCED refrigeration repair men, now working on jobs less important to the national welfare, have been requested by the War Manpower Commission to return to their former occupations. The peacetime total of approximately 28,000 of these repairmen in domestic service has decreased about 70 per cent, or 19,600, during the war, WMC said.

The shortage of such workers, WMC said, presents a serious threat to national health. War conditions make proper refrigeration, always necessary, vitally important. Refrigeration equipment, however, is impossible to replace. Old machinery must be repaired and kept in use if the nation's food supply and the people's health are to be preserved.

Local United States Employment Service offices have been notified by the War Manpower Commission to:

1. Take action to return to the refrigeration industry workers who have left it for other employment and who are not working above the skills of the refrigeration occupations. All USES offices should encourage and actively negotiate transfers of these and such other workers with experience in refrigeration occupations from other industries.

2. Encourage part-time employment in the



Par Model HA-2

- Fits like a glove . . . engineered and designed for small display cases and large domestic applications.
- A sturdy $\frac{1}{4}$ H.P. 2 cylinder air cooled unit with large condenser and bull's-eye sight oil gauge.
- Embodies the 28 PAR features . . . slow speed . . . and fast pump down.
- Prompt delivery on properly rated orders.
- Write for illustrated brochure of details.
- BY COMPARISON—YOU'LL BUY PAR.

PAR Division

LYNCH
MANUFACTURING
CORPORATION
Defiance, Ohio, U.S.A.

refrigeration industry including part-time employment of workers qualified in refrigeration occupations regularly employed full-time at equal or higher skills in essential industries.

3. Collaborate with the Office of Civilian Requirements to put the refrigeration industry on an equitable basis with other essential activities in providing conditions favorable to retention and recruitment of workers.

4. Certify the need for training such workers where such need exists.

5. Utilize aptitude tests in selection of trainees for the industry. A WMC program for training workers for the refrigeration industry is already in operation.

§ § §

METHYL CHLORIDE LIMITATIONS

(Continued from page 19)

resulting in loss of life. If good service engineering had been used in connection with the changeover from "Freon 12" to methyl chloride in the machine involved in the accident, then the accident could not have occurred. Adequate ventilation, which in this case was not provided, would have taken care of the excessive concentrations of methyl chloride. Obviously, elimination of the aluminum gasket would have prevented the leak in the first place.

The question is often asked: Are there other metals in a machine which can not be safely used with methyl chloride. Aluminum is the one exception although there is a possibility that, due to the large production of magnesium, this latter metal might be used in the future. Its use should not be permitted with methyl chloride.

Leak Detection

The halide torch or lamp, which is used so universally by service engineers, does not have the blessing of the manufacturers of methyl chloride, or of the manufacturer of the halide torch itself. This is apparently due to the fact that it is possible to ignite a proper mixture of methyl chloride and air by means of the halide lamp. Explosions due to ignition of methyl chloride by a halide lamp have not, to the knowledge of the writer, occurred. Adequate ventilation must be present before tests are made with the halide torch, both to eliminate danger of an explo-

sion and to prevent possible harmful effects to products formed when the methyl chloride passes through the flame of the halide lamp.

It should always be borne in mind that the halide lamp can set off a mixture of methyl chloride in air, provided such a mixture is present. Therefore, ventilate the area before using a halide torch. Ventilation of the area is also extremely important due to the fact that after the leak is located, the service engineer may be required to work in this area for a longer or shorter period of time.

The best compliment that has ever been paid to methyl chloride is the fact that despite some of the very rough usage it has received, and despite the conditions under which it has been called upon to operate, there have been relatively few accidents associated with it. It can be dangerous but from a practical standpoint it has not been proved to be a dangerous material when properly used.

This discussion doubtless will raise some questions which have not been covered by it. The writer will be glad to consider any such questions and will attempt, on request, to give adequate answers.

§ § §

SERVICE FIRM INCREASES STAFF

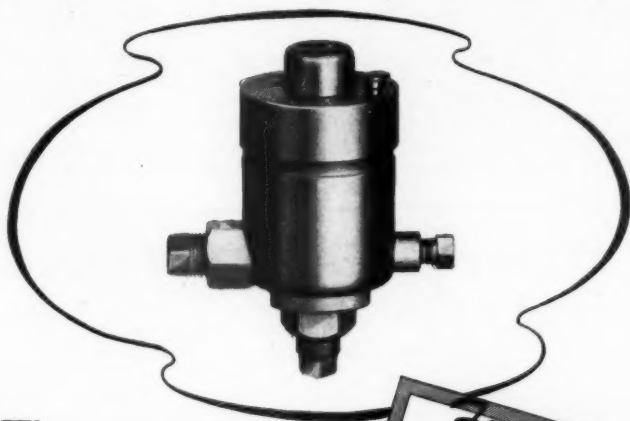
THE Wright Refrigeration Service, 1337 India St., San Diego, Calif., announces the enlargement of its staff by the addition of Jack Hardy and Jack Farnum. R. A. Wright, manager, says the growth of San Diego as an important war center has been reflected in an increase in installations of refrigeration service units. Messrs. Hardy and Farnum will take over the management of the sales department. This concern operates 15 service trucks to serve wholesale and retail stores, post exchanges and all types of military and industrial food refrigeration units.

§ § §

Mr. M. A. Taylor,
Rapid City, S. D.

I have noticed that there are a lot of service men out this way that never saw your paper before. They surely don't know what they miss. How about a subscription drive so as to get the many new men at the game in contact with the best advice and information—that is, the REFRIGERATION SERVICE ENGINEER.

CONTROL WITH *Temprite* VALVES



WHEN Temprite Constant Pressure Two-Temperature Valves are used, constant temperatures are assured at all times and the performance of the refrigeration system is greatly improved.

Sensitive operation, perfect sealing seat and rugged construction are essential features for a satisfactory two-temperature valve and it is these features that account for the Temprite Valves' unfailing performance.

The Temprite Two-Temperature Valve is an essential part of any multiple type refrigeration system and is also recommended for use on single applications where closer and more constant regulation is required than can be furnished by the condensing unit control switch.

No refrigerating system is better than its control; that's why the Temprite Constant Pressure Valves are preferred by refrigeration engineers who recognize their outstanding performance in general commercial work.

Features

- 1 Easy to adjust
- 2 Easy to install
- 3 Wide range of adjustment
- 4 Close temperature control
- 5 Extreme sensitivity
- 6 Rugged and dependable

For complete specifications and prices on Temprite's Constant Pressure, Two-Temperature Valves write or wire our Sales Department today.

TEMPRITE PRODUCTS CORP.

Originators of Instantaneous



Liquid Cooling Devices

45 PIQUETTE AVENUE

DETROIT, MICHIGAN

THE QUESTION BOX

(Continued from page 36)

yond my ability to state, since it could be anything, including the various types of brines used, or just plain water.

I would think it would be advisable to incorporate a fan with the cooling coil because it seems hardly possible that there would be sufficient air circulation from one end of this case to the other to provide an even temperature throughout the length. In installing this fan, it may also be necessary to provide some sort of baffling arrangement, or an air duct from one end of the refrigera-

tor to the other, in order to assure air circulation throughout the full length.

This might be done by utilizing the shelving arrangement to divide the refrigerated space into an upper and lower half—then putting the fan in the lower half below the coil, blowing the air upward through the coil along the upper half of the refrigerator, and returning it through the lower half. This would apparently be circulating the air in the opposite direction to usual practice, but since your coil is mounted within five inches of the top, it may be difficult to arrange it so that air could be circulated in the opposite direction as stated here.

Why the Middleman is Helpful to Business

MIDDLEMEN have been much maligned for many years. "Eliminate the middleman" has been the battle cry as far back as this writer can remember. However, middlemen possess certain important advantages, and here is a diagram that shows visually how to eliminate considerable commotion by utilizing the middleman.

greater the number of dealers and manufacturers involved, the greater the value of the middleman to both.

The telephone is an excellent illustration. If there were 20,000,000 telephones in this country, and if all "centrals" should be eliminated, each telephone would be obliged to have a direct line to every other tele-

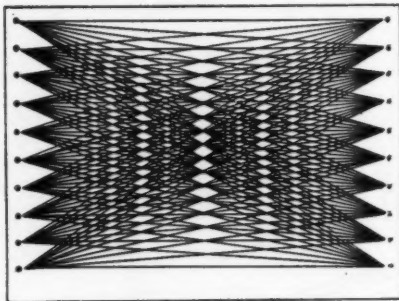


FIG. 1.

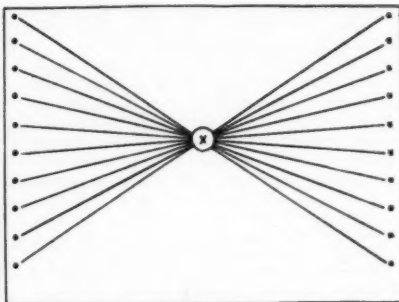


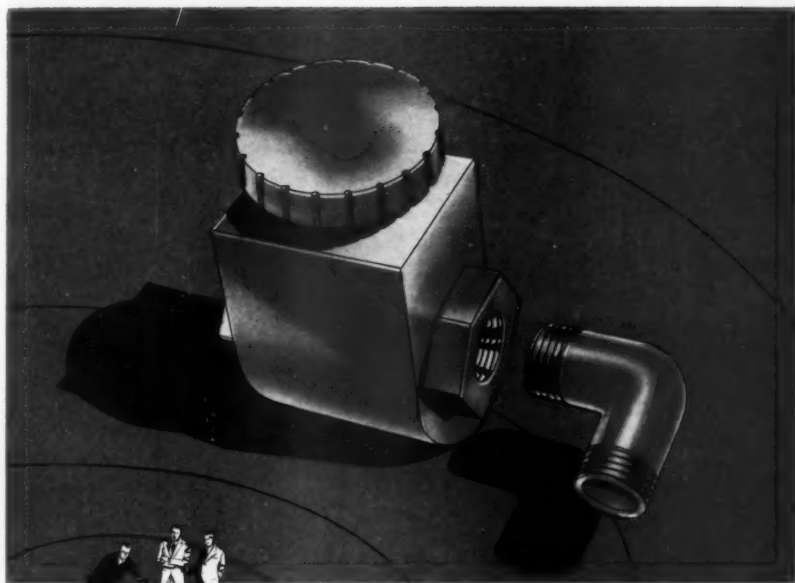
FIG. 2.

Fig. 1 shows what happens when 10 dealers deal directly with 10 manufacturers. The 100 connecting lines represent 100 transactions. If there were 20 dealers and 20 manufacturers there would be 400 transactions. Fig. 2 shows how the middleman simplifies the situation. Instead of 100 transactions for the dealers and for the manufacturers there are now only ten. In other words, the middleman reduces the number of transactions by 90 per cent. The

phone. How many lines would there then be? In view of the above the answer is $20,000,000 \times 20,000,000$ or 400,000,000,000 lines. The cost of such a system, of course, would be unbearable.

\$\$\$

Your Red Cross is at his side. Husbands and fathers, brothers and sons in the service, all call upon the Red Cross in an emergency. Help keep the Red Cross at his side by supporting the Red Cross War Fund.



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FOR DEPENDABILITY *Tomorrow*

The *Dependability* of Kerotest Valves and Fittings, daily demonstrated today in active combat duty equipment and hundreds of other homefront refrigeration and air conditioning applications, is the result of many years of successful engineering design and experience in valve manufacture. ¶ That's why so

many designers and engineers think of *Kerotest* in their plans for tomorrow's advanced air conditioning and refrigeration equipment.



KEROTEST'S "M" Pennant and Victory Fleet Flag—awarded by the U. S. Maritime Commission for outstanding marine service production —now carries the Fleet Solid Star.

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Refrigeration Service Engineers Society

Official Announcements of the activities of the International Society and Local Chapters appear in this department as well as articles pertaining to the educational work of the Society.



THE OBJECTS OF THE SOCIETY

To further the education and elevation of its members in the art and science of refrigeration engineering; for the reading and discussion of appropriate papers and lectures; the preparation and distribution among the membership of useful and practical information concerning the design, construction, operation and servicing of refrigerating machinery.

INTERNATIONAL HEADQUARTERS: 433-435 North Waller Ave., CHICAGO 44, ILL.

Citation for Maintaining Refrigeration Facilities Presented to Youngstown Chapter

OPENING the Service Men's Recognition Campaign, the Youngstown (Ohio) Chapter of the Refrigeration Service Engineers Society held a big meeting in the Ohio Edison Auditorium, Friday evening, January 14.

High light of the program was the introduction of Lief Oyen, manager of the War Production Board, who complimented the

Chapter on the work accomplished by its members. Mr. Oyen read and presented to President Wright for the Chapter a citation from Fred Gardner, director, General Industrial Equipment Division, WPB Washington. Mr. Oyen then called to the platform the three oldest members in point of refrigeration service: Earl Van Cise, Martin Bokesch, Gene Kreitzburg, and extolled their



VIEWS OF YOUNGSTOWN MEETING

Upper left: Lief Oyen introduces "Old Timers," Gene Kreitzburg, Martin Bokesch, E. W. Van Cise and Ed Wright.

Above: Part of crowd attending the Youngstown Chapter meeting. Photo taken during presentation ceremonies.

Lower left: A group of Youngstown Chapter members and delegates from Canton, Akron and Cleveland.



HOW SOON
CAN YOU
DELIVER MY
REFRIGERATOR?

MANUFACTURERS:

That's the first
Postwar question
you'll have to answer

If you can't answer it NOW

CONSULT Chieftain engineers for
help with your postwar
unit applications—no obligation, of course. So
write us today!



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TECUMSEH • MICHIGAN**

good work in the past and pointed out that the younger members and new men coming into the industry could well follow the example set by these men in faithful service to the industry as well as to their customers.

Approximately 800 refrigeration service engineers from the Mahoning Valley with industrial representatives as guests crowded the auditorium.

A special guest of the occasion was George

F. Taubeneck of Detroit, who delivered one of his interesting and inspiring addresses. Mr. Taubeneck said that refrigeration may ultimately be classed as one of America's chief "secret weapons" of the present war. To the trying conditions of war, when problems of combat, transportation and feeding have to be solved quickly, he attributed many of the changes now occurring in refrigeration, the benefits of which eventually will be

WAR PRODUCTION BOARD

WASHINGTON, D. C.

IN REPLY REFER TO:

November 29, 1943.

November 29, 1943.

Youngstown Chapter Refrigeration Service Engineers Society
In-care-of Mr. Leif Oyen, District Manager,
War Production Board,
902 Union National Bank Building,
Youngstown-3, Ohio.

Gentlemen:

Mr. Frank M. Aldridge, Deputy Regional Director of Region 5, War Production Board has forwarded to me a copy of a memorandum addressed to him by Mr. Oyen regarding the splendid cooperative effort put forth by the members of your organization.

The repair and maintenance of refrigerating equipment is one of the truly important activities upon which production for war directly and indirectly depends.

The trade papers read generally by persons engaged in your industry should welcome the opportunity to give the widest possible publicity to the efforts you have made and to an account of the results you have obtained.

It is indeed a privilege to me to commend your fine performance and to invite you to call upon this Division if, in your opinion, we can be of assistance to you.

Sincerely yours,

Fred W. Gardiner
Fred W. Gardiner, Director
General Industrial Equipment Division

available to the public. The war, he said, has developed many new uses for refrigeration in industrial work and new uses will come as a natural result in the near future.

The Recognition Campaign was originated by E. S. Wright, president of the Youngstown Chapter. The main idea of the campaign, he explained, is for manufacturers, trade papers and others who have contact with the trade, to advise the public through advertisements and articles of the importance of the refrigeration service man in the war effort, as well as peacetime, in keeping refrigerating units running and thus protecting the food supply of the world.

War Bond Presented

Following the presentation of the WPB citation, Secretary Campbell, on behalf of the International Society, presented Warren W. Farr, regional chairman of the Membership Campaign, an award of a War Bond for his outstanding work in that campaign. Mr. Farr then read a letter from International headquarters complimenting the Chapter on winning the award for first prize for the largest percentage of growth in the membership campaign. Mr. Farr added his personal thanks for the cooperation of the members and presented the Chapter with a check for the prize money.

Congressman Michael Kirwan, who has gained national repute in his work in behalf of the Ohio-Lake Erie Canal and on various flood control and water conservation measures, was a guest of the meeting and spoke on the necessity of right thinking on the part of the public on future developments, not only in refrigeration but in conservation and development of natural resources.

Ray Kromer, director of the National Refrigeration Manpower Training Program, told about the new service man's training program.

§ § §

Pat. M. Kashiwabara,
Honolulu, Oahu, T. H.

Thank you very much for the fine service you have given me for the past year. I am grateful for the information given to me concerning new refrigeration products.

The "Question Box" is especially handy. I have come to depend on those few pages to find my own troubles and have found out on more than one occasion that it has helped straighten up my troubles.

R.S.E.S. Chapter Notes

INTERPROVINCIAL ASSOCIATION

January 5—A meeting of the executives of the association was held in the office of the Wagner Electric Division of the Sangamon Co. The majority of the officers were present and the meeting was called to order at 6:30 P.M. A good deal of discussion was devoted to the forthcoming annual meeting and the routine to be followed in the presentation of the association's Charter. It was brought out that arrangements had been made with the international office to have Mr. John K. Bush of Lockport, N. Y., make the presentation, and upon the agreement of the meeting, the Association's President along with the Presidents of all the Chapters represented would receive the Charter.

The problem of deferments for refrigeration men was given considerable discussion, along with the seriousness of the present lack of refrigeration service men throughout Canada. Greater efforts in obtaining deferments were, therefore, urged in order to conserve the present manpower in the service industry.

Committee men who of late have become inactive were relieved of their positions at this meeting and new committees formed. Six new applications for members were received and were started on their routine of investigation and final report to determine their acceptability.

MAGNOLIA CHAPTER

January 14—A business meeting of the Chapter was held at 246 East Capital Street and since the Chapter is still in the formative period, one of the first acts of this meeting was the election of new officers. A nominating committee was instructed to select two members for each office, and after they had made their report, the election was held resulting in the following: *President*, L. H. Williford, Jr.; *First Vice-President*, C. W. Bowron; *Second Vice-President*, S. M. Sansing; *Secretary*, C. B. Lay; *Treasurer*, Joe G. Pollard; *Sergeant-at-Arms*, S. C. Odom; *Chairman of the Educational Committee*, A. E. Shafer.

The minutes of the last meeting were read and the Charter was presented to the Chapter. After some discussion, it was decided to hold two regular meetings each month, these meetings to be on the second and fourth Wednesdays, unless otherwise notified. A. E. Shafer, Chairman of the

Educational Committee, appointed J. P. Binns and B. L. Palmer to present the educational program of the meeting to be held January 26. The subject of this program was to be "Changing from Freon Systems to Methyl Chloride" and "How to Detect Oil Shortage in Systems."

SAN DIEGO CHAPTER

January 13—The meeting was held at one of the local supplies distributors' show-rooms. Mr. Phillips, a long time member, is the local manager of Refrigeration Supplies Distributors and with his cooperation, they have a great number of meetings there. They had an attendance of twenty-six. One of the members, Pfc. Robt. King-solver of the U. S. Marines, paid a surprise visit. He had just finished combat training and is now stationed at a base nearby where he is acting as an instructor in refrigeration.

After the business session, the meeting was turned over to Mr. M. Gallagher, chairman of the evening. He introduced the new officers and a vote of thanks was given to the retiring officers. They were then entertained by several sound films fur-

nished by the South Bend Lathe Works which were very interesting and enjoyed by all. These were followed by a news reel which concluded the meeting.

CORN BELT CHAPTER

December 15—Presentation of the second prize offered by the International Office in a recent membership drive was made to the Chapter by State President Clarence Stumpf. The check was presented to the President of the Chapter, John Hamilton, who in turn, turned it over to H. V. Oak-wood, Treasurer. R. O. Hendrickson, Chairman of the Educational Committee, presented the Virginia Smelting Co. film "A Trip Through Virginia Smelting" which showed the methods of producing sulphur dioxide and methyl chloride.

January 13—Features of the educational program included films on servicing General Electric equipment shown by H. R. Lutenbacher, District Supervisor of the General Electric Co. F. M. Bush of R. Cooper, Jr., Inc. gave a short talk on the new replacement unit for monitor top General Electric units. It was suggested by R. L. Hendrickson that the services of a

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library on films be obtained where films of various manufacturers could be secured for programs.

LOS ANGELES CHAPTER

December 29—The meeting was held at the Royal Palms Hotel and presided over by President W. C. Irving. Applications for membership were received from Robert C. Marshall, Arthur E. Johnson, Frank D. Windsor, John Ward and Roy Fortner.

The speaker of the evening, Mrs. Edith Kennedy, was introduced by Mr. Merle Stutzman. Mrs. Kennedy, head of the Special Employment Service of the U. S. Employment Department, gave an interesting talk regarding the training of returning veterans and also the civilians that have in the past been a problem to society because of various handicaps. Many defense plants and post war manufacturing establishments have now used many of these less fortunate people and they have proven themselves capable and have overcome many obstacles to which many have in the past given little thought.

At the end of Mrs. Kennedy's talk a few minutes were given over to questions

as to how the organization could assist with the work and how they might help absorb many of those people within their industry.

Mr. Lawrence Halls, of Refrigeration Service, Inc., was called upon to give some new information on priorities, maximum price regulations under C.M.P. regulation No. 9 and the society was informed how it would be possible to raise hourly prices under certain conditions.

The annual election of officers was held resulting in the following: *President*, Edward L. Glaser; *First Vice-President*, V. E. Denny; *Second Vice-President*, F. C. Kirkham; *Secretary*, A. D. Dawson; *Treasurer*, Graham R. McLay; *Sergeant-at-Arms*, Michael Rohan; *Educational Chairman*, A. V. Wills; *Board of Directors*, W. W. Allison, J. C. Rodgers, W. C. Irving, A. O. Ludtke and W. B. Decker.

WYOMING VALLEY CHAPTER

January 10—The meeting was presided over by President Harris. Miscellaneous business matters were taken care of in short order and a bill for recent party expenses presented and ordered paid. On the educational program was a showing of motion

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PERMANENT ELIMINATION
OF MOISTURE TROUBLES!



any place in the system... instantly eliminates ice at expansion valve... cannot cause any damage to refrigerant, oil or any of the parts of the system. Ice-X is the original, fully patented, liquid formula for dehydration.

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THE HARRY ALTER CO. 1728 S. MICHIGAN AVE.
CHICAGO 16, ILLINOIS

JOBBERS: WRITE FOR SPECIAL PROPOSITION!

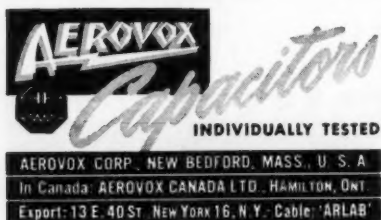


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- The Aerovox "Victory Line" of universal types is the answer to wartime conditions and material restrictions. 22 types of electrolytic capacitors for 110-volt operation; 8 types for 220-volt. These 30 universal types, constituting the Aerovox Victory Line, take care of upwards of 90% of all motor-starting replacements.
- So keep 'em running, for the duration, with Aerovox Victory Capacitors. Customer satisfaction assured. And you can make a nice profit.

• Ask Our Jobber...

Ask to see the Aerovox Victory Line listings, and also the conversion chart so you can pick the right wartime replacements. Or write direct.



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pictures by General Motors and Castle War pictures. These pictures were presented by Mr. Reese and thoroughly enjoyed by the members.

MILE HIGH CHAPTER

January 15—This being a special meeting to which non-members and others interested in refrigeration had been invited, the presiding officer asked each visitor to introduce himself. Thirty-seven visitors were present, including several from Public Service Company, Snotgrass & Smith of Denver, Teason Brothers from Colorado Springs, and Halle's Electric from Colorado Springs. There were also some visitors from Greeley, and Denver and surrounding territory.

Mr. Ted Foulk of the Public Service Co. was the principal speaker for the evening. Mr. Foulk has been appointed temporary coordinator for the government's wartime training program for refrigeration servicemen and he outlined the plans of this program. He explained that as soon as possible he was to call a meeting, and at that time, the group would elect the necessary coordinators and committees to carry out the program.

He stressed the importance this training program would have on meeting the demands for manpower in refrigeration service, and he cited some figures to show how badly men are needed to carry on the necessary civilian service, and to keep existing equipment in operation for the duration, if possible, so that it would not be necessary to stop production on war material to make new refrigerators, etc.

Ernie Martin discussed the beginning of the frozen foods and its progress to date. Priorities were discussed by Don Wallace from Frigidaire, after which he showed two sound films entitled "Selling America" and "Diesel, the Modern Power." Refreshments were served following the meeting.

CLEVELAND CHAPTER

January 27—The annual election of officers was held on this date and after following the usual routine, the results were as follows: *President*, Warren W. Farr; *First Vice-President*, Paul Spring; *Second Vice-President*, Joe Smylie; *Secretary*, J. A. Brown; *Treasurer*, Walter Wright; *Sergeant-at-Arms*, Roy McCloskey; *Educational Chairman*, A. M. Fenwick; *Board of Directors*, Geo. Schulz, Geo. Baumgardner, Gerald T. Hasman, Glenn Keller and Ormond B. Herrick.

MOUNT ROYAL CHAPTER

December 9—This was the annual meeting of the Chapter and, therefore, the business session was devoted primarily to reports from the treasury and the Secretary and to the winding up of the year's activities. A report of the past year's activities showed that an impressive schedule of interesting programs had been successfully carried through and that it was the wish of the meeting that a similar schedule be outlined for the coming year.

The nominating committee presented its slate of officers for the coming year and during the course of the election, the slate was unanimously approved by the meeting. Those elected are: *President*, P. Tremblay; *Vice-President*, C. A. Fabien; *Second Vice-President*, C. E. Pigeon; *Treasurer*, J. M. Turner; *Recording Secretary*, Arthur Brown; *Correspondence Secretary*, Ross Turner; *Sergeant-at-Arms*, A. Gravel; *Chairman of the Membership Committee*, B. Lacerte; *Chairman of the Educational Committee*, J. A. St. Laurent; *Entertainment Committee*, Messrs. Gendron and Gravel; *Board of Directors*, A. Blanchard, H. Milne, J. A. Tremblay, J. A. Lemay, D.

Greenberg, A. Brown, J. Galley; *Auditor*, C. E. Pigeon.

January 11—Mr. St. Laurent drew the attention of the meeting to the resignation of R. McCullough as Chairman of the Educational Committee. Subsequently, Mr. St. Laurent was elected to carry on the educational work. Arrangements were made at this meeting for a smoker to be held at a forthcoming meeting. Refreshments will also be a part of the meeting.

TOLEDO CHAPTER

December 8—A regular meeting of the Chapter was held on this date preceding a Christmas party given for members and their families. Bingo was a feature of the party and presents were provided for the children. Lunch and refreshments, of course, were served during the evening.

A part of the business meeting included the annual election of officers. Those elected were: *President*, Lloyd Sabin; *Vice-President*, Warren H. Mahon; *Secretary and Treasurer*, Dale Moog; *Sergeant-at-Arms*, Paul Sizer; *Board of Directors*, Harold Benington, Earl Turner, Fred Rudolph, Tracy Riches, Paul Roop and Paul Sizer.

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Individually tested for efficient operation—these valves may be mounted in any position and will give dependable, trouble-free performance. Brass body, two ply power bellows, and corrosion resistant materials for all parts. WL valves are available in $\frac{3}{8}$ inch FPT and WP valves in $\frac{3}{8}$, $\frac{1}{2}$, and $\frac{3}{4}$ inch FPT.

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CHICAGO 16



TYPE WP

During the business session, President Sabin outlined his plans for the coming year with respect to the Chapter's activities. Some discussion was devoted to the advisability of a local code in which a letter from Atlanta Chapter was read concerning a code in Atlanta. F-22 developed into an interesting discussion by all members present and Mr. Turner provided some useful information on F-22 and its probable applications.

NOVA SCOTIA CHAPTER

January 12—This was the date of the monthly meeting of the Chapter. The attendance at this time, however, was small due to an epidemic of flu in the community and rather hazardous traveling occasioned by the weather. The U. S. A. safety code provided the nucleus of a discussion which occupied the greater part of the evening. The meeting adjourned at 10:00 P.M.

KANSAS CITY CHAPTER

December 1—New members initiated during the meeting were: Ivan J. Zancker, W. F. Schreiber, A. C. Taylor, Wm. J. Fields and Francis Shirley. Since this was the annual meeting, the nominating committee presented its choice of officers for the coming year.

The final results of the election were as follows: *President*, C. R. Visger; *First Vice-President*, W. F. Schreiber; *Second Vice-President*, M. L. Ferguson; *Secretary*, J. P. DeWilde; *Treasurer*, Howard Ward; *Sergeant-at-Arms*, Floyd Haller; *Board of Directors*, R. E. Meeker, R. F. Cox and Geo. Rostock.

The remaining part of the business session was devoted to plans for the coming year with particular reference to the educational programs. The educational program of the evening included an open discussion on non-condensable gases, its effect on refrigeration systems and methods of removing from the system.

WESTERN MASSACHUSETTS CHAPTER

January 26—The regular routine of business was closed in short order, when balloting on five new members was taken up and all were voted in. The meeting was then turned over to Messrs. Carl Page and Carl Payson, who presented the son of one of the members who rendered several guitar selections to the enjoyment of all. Mr. Douglas Marshall of the Automatic Products Co. had some controls with him. Mr.

Robert Hinkley, a master electrician, gave an interpretation of the code as it affects refrigeration service work. A buffet lunch was served to the 86 members and guests.

DAYTON CHAPTER

January 13—The meeting was held at Allied Parts Co. with a good attendance. During the business session, the Chapter agreed to purchase three dozen new chairs for use at the meetings. The educational program consisted of a motion picture furnished by the Highside Chemicals Co. entitled "The Story of Thawzone." This picture proved interesting and informative.

MAPLE LEAF CHAPTER

January 21—Early in the evening, Mr. Marshall, Chairman of the Educational Committee introduced Chas. O. Cunningham of Kelvinator. Mr. Cunningham gave an interesting talk on hermetically sealed units which was greatly enjoyed by the exceptionally large meeting. The balance of the evening was devoted to reports and discussions on business matters of the Chapter.

Ladies Auxiliary

KANSAS CITY AUXILIARY

During the course of the December 1st meeting, the annual election of officers was held with the following being elected: *President*, R. E. Meeker; *Vice-President*, A. M. Hoover; *Secretary-Treasurer*, C. R. Visger; *Sergeant-at-Arms*, F. C. Smith; *Board of Directors*, M. L. Ferguson, H. L. Green and J. P. DeWilde.

Another meeting was called for December 8 for the purpose of completing plans for the annual Christmas party and to discuss unfinished business. Most of the evening was devoted to these arrangements and to the summarizing of the year's activities. Some worth while suggestions were brought out, aimed at improving the auxiliary's activities for the coming year. After the business meeting adjourned, the ladies and their men enjoyed cherry pie and coffee.

TWIN CITIES AUXILIARY

The auxiliary met January 4 for a luncheon and social afternoon at the Covered Wagon. There were fourteen members present. Mrs. Lewis is moving to New Orleans in the near future. She resigned her position as Sergeant-at-Arms and Mrs. Hanson was chosen to fill the position.

JOBBERS ESTABLISH AWARD FOR MANUFACTURERS

THE National Refrigeration Supply Jobbers Association recently announced the establishment of an annual award to be presented each year to the manufacturer of refrigeration parts and supplies whose policies, product-quality and promotion are considered most outstanding. Members of the Jobbers Association are now casting their ballots to determine the company which will be awarded the trophy for the year 1943.

It is planned to announce the name of the winner and present the award in connection with the annual spring convention of the Association which will be held this year at the Stevens Hotel in Chicago on April 25 and 26.

The trophy itself is in the form of a beautiful sterling silver loving cup appropriately engraved, designed and fashioned by Crichton of London. Sixteen inches high, it is fashioned in graceful classic lines. The trophy will be awarded each year to the company selected by the membership of N.R.S.J.A. and when the same company



Trophy to be awarded by jobbers to "Most Outstanding Manufacturer."

has received the award for the third time the trophy will remain in its possession permanently.

Object of the award is to stimulate the interest of manufacturers in the economical distribution which is obtainable through members of the refrigeration supply jobbers association.





Superior has gone to War!

- ★ DIAPHRAGM PACKLESS VALVES
- ★ PACKED AND PRESSURE CUP VALVES
- ★ CHECK VALVES AND LIQUID INDICATORS
- ★ DEHYDRATORS AND FILTERS
- ★ MANIFOLDS AND HEAT-EXCHANGERS
- ★ FITTINGS AND ACCESSORIES

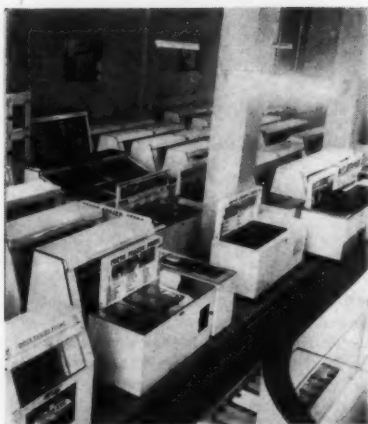
Even though we are working "round the clock" on implements of war, every passing month strengthens our conviction that refrigeration equipment is so vitally essential that we should continue to allocate an increasing percentage of our manufacturing facilities, personnel and planning to our refrigeration products.

THAT'S OUR POLICY . . . continuing to do even a better job of supplying, as promptly as conditions will permit, more valves, manifolds, heat exchangers, dehydrators, liquid indicators, fittings and accessories to manufacturers, jobbers, installers and service engineers.

Write for Copy of Catalog R-2 No. 67

SUPERIOR VALVE & FITTINGS CO.
1509 WEST LIBERTY AVENUE
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Available from our large stocks are frosted food cabinets, farm freezers, reach in cabinets, display cases, condensing units, coils, valves, tubing, etc. Also job lots of refrigerating equipment of all types.

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DAVISON CHEMICAL ANNOUNCES PROCESS DIVISION

FORMATION of a new Process Division with E. B. Dunkak as manager has been announced by Chester F. Hockley, president of the Davison Chemical Corporation. This Division is staffed by engineers and experienced technicians who have had years of practical experience in working with industry, not alone in United States, but in Great Britain, and France. It will coordinate with the existing Davison engineering and research departments in broadening the service to industry, and will offer the process industries a complete service and consultation in design and the engineering of process equipment. "The executive offices," Mr. Hockley stated, "will be at the home office in Baltimore, Md., with field offices in strategic markets of the country."

REFRIGERATION MEN ATTEND CHASE OPEN HOUSE

ALL phases of refrigeration in the Chicago area were represented at the grand opening of the Chase Refrigeration Supply Co. under its new owners C. S. Swanson and Jack Glass. The weather man contrived a dense fog in honor of the February 2 date which was supposed to please Mr. Ground Hog. The fog didn't discourage the refrigeration men either. They turned out in large force to inspect the attractive store and the well set up parts handling facilities of the Chase organization on the south side of Chicago.

With the promise of an early spring the service men had an opportunity to look over the equipment stocks with an eye to what they can use in the busy days ahead. The manufacturers representatives were shown what available space there was on the shelves to display their wares. The high point of the evening was reached when the hosts invited the guests to help themselves to the smorgasbord spread on long tables.

This Swedish cold supper had been furnished by a well known Chicago caterer who apparently forgot ration points for one evening and just let himself go. Not to be outdone the guests also let themselves go. A single complaint was heard,



C. S. SWANSON
Chase Refrigeration Supply Co.

one man said he was sorry he had let his wife talk him into eating dinner before he came.



JACK GLASS
Chase Refrigeration Supply Co.

Following the supper the men gathered in informal groups, discussed developments to date, and enjoyed the cigars passed out by Messrs. Glass and Swanson. All in all it was a grand opening for the Chase Refrigeration Supply Co. under its new owners.

Disaster relief units equipped with mobile first aid facilities and canteens are on the alert at strategic points to aid the victims of fire, flood or accident. Help the Red Cross to help others in an emergency! Support the 1944 Red Cross War Fund appeal!

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It's profitable
business when
you can handle it



and you can
handle it with
HERVEEN

★ Every well equipped service shop will find it can make extra profits by being able to service Frigidaire Meter-Misers. Using Herveen you can guarantee satisfaction.

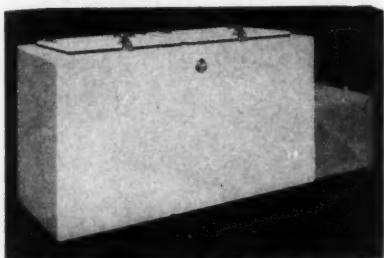
HERVEEN
brings in business

★ Herveen is the replacement gas for Frigidaire Meter-Misers that makes it possible for you to get this profitable Hermetic business. If your jobber doesn't handle Herveen, write us direct.



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Manufacturers and Refiners
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SANITARY Quicfrez



Model illustrated—No. C-1243
Capacity, 12.5 net cu. ft.
Holds up to 600 lbs. of frozen food

FARM LOCKER PLANTS . . .

Long before Pearl Harbor, thousands of farmers were already proving the rich benefits of the **SANITARY QUICFREZ** for freezing and keeping all farm-grown meats, poultry, game, vegetables, fruits. They are saving food, time, transportation, and enjoying year 'round food variety, and a more healthful diet.

Sanitary dealers will not have to wait for engineering developments. They will be ready when production is permitted—with a product backed by a company already nationally recognized as one of the leaders in this field.

Sanitary Refrigerator Co.
Fond du Lac, Wisconsin



FOR VICTORY
BUY
UNITED STATES
WAR
BONDS
AND
STAMPS

BUY WAR BONDS NOW...

and

FARM LOCKER PLANTS

AFTER THE WAR

GENERAL ELECTRIC HOLDS JOBS FOR RETURNED SOLDIERS

TWENTY FOUR HUNDRED General Electric employees who entered the armed services since Pearl Harbor and have been honorably discharged from active duty, have been placed back into the working forces of the company, Gerard Swope, president, has announced. Records show there are still 89,286 of the company's employees in service and that 156 have lost their lives or are reported missing in action.

"As our employees come home from the armed services we hope to have their old job waiting them, or one equally as good," Mr. Swope said. "It's going to take considerable readjustment to give the men the jobs they left, but we sincerely hope this can be done."

NEW G. E. DISTRIBUTING BRANCHES

HARDAGE L. ANDREWS, General Electric vice-president in charge of the Appliance and Merchandise Department, announces the establishment of two factory distributing branches, one in Philadelphia and another in Los Angeles, Calif. These branches are responsible for the wholesale distribution of the following products: General Electric household refrigerators, ranges, water heaters, home laundry equipment, dishwashers, disposals and kitchen cabinet equipment.

J. A. Rafferty, who has been associated with the merchandising of General Electric products for more than 15 years, has been appointed manager of the Philadelphia branch with headquarters at 2814 Market St., Philadelphia.

C. W. Griffith has been appointed manager of the Los Angeles office with headquarters at 212 North Vignes St., Los Angeles, Calif.

MORE MILEAGE FOR OLD BELTING

INDUSTRIAL So-Lo, a product for repairing breaks, burnt or worn spots, filling holes and for resurfacing industrial belts of all types—rubber, rubber composition, leather, and cotton—is now being made with synthetic rubber. The manufacturer claims it will greatly lengthen the life of belts and permit continued use of some conveyor belts that might otherwise be discarded. It is easily applied, dries tough overnight, and is very economical. One quart covers approximately 14 square feet.

LIQUID CARBONIC CORP. ELECTS W. D. JORDAN VICE-PRESIDENT

AT THE annual meeting on January 13, W. D. Jordan was elected vice-president of The Liquid Carbonic Corporation of Chicago. Mr. Jordan joined Liquid in 1988 as manager of the specialty products division, to develop and market a line of ice cream cabinets, frosted food cabinets and related products. Early in 1941 he became an active member of the Priorities Committee of Dairy Industries Supply Association, and spent most of that year in Washington on priorities.

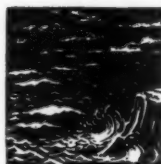
Early in 1942 he was appointed manager of Liquid's War Products Division to handle the company's war contracts, and subsequently was also named director of Soda Fountain and Cabinet Research and Planning Committee. He is a member of the board of directors of Dairy Industries Supply Association, a member of the War Problems Committee of the same association, a member of the board of directors of the National Dairy Council, and a member



W. D. JORDAN
Liquid Carbonic Corp.

of the General Refrigeration Advisory Commission of the War Production Board.

Mr. Jordan has been affiliated with the Dairy and refrigeration industries since 1924, when he assumed the work of directing promotion and new business development for the Bridgeman-Russell Creamery Company.



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CHEMICALS CO.**

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Newark 4, N. J.

THE smart refrigeration service engineer knows that our sketch-equation is another way of reminding him that moisture disappears from refrigerating systems when THAWZONE, the Moving Dehydrant, "tracks" it down and destroys it, leaving the unit as "dry" as the proverbial desert.

That's why he is using more of it each succeeding year.

He also knows that smart jobbers are never without THAWZONE in the three well-known sizes.

THAWZONE

Full Protection by U.S. Patents

The PIONEER FLUID DEHYDRANT

SERVICE

Reliable service from large stocks. Your requests for refrigeration supplies are handled with expert care.

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212 N. Jefferson St. Tel. Haymarket 0555 CHICAGO 6, ILL.

ADMIRAL CORP. ACQUIRES RANGE AND REFRIGERATOR DIVISIONS OF STEWART-WARNER

AN AGREEMENT has been entered into under which Admiral Corporation plans to acquire the refrigerator and electric range manufacturing divisions of the Stewart-Warner Corporation, according to an announcement made by Ross D. Siragusa, president of Admiral Corporation.



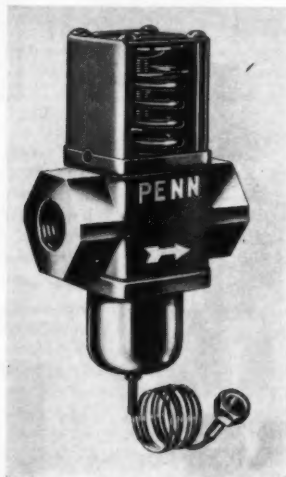
ROSS D. SIRAGUSA
Admiral Corporation

Provisions of the agreement stipulate that Admiral Corporation plans to acquire the tools, dies, jigs and fixtures, trade names, patents, patent rights and pending patent applications, as well as engineering developments in progress in the refrigeration and electric range manufacturing divisions of the Stewart-Warner Corporation. The facilities and assets enumerated were those utilized by the Stewart-Warner Corporation prior to the war in the manufacture of refrigerators, electric ranges and food lockers.

Admiral Corporation in peacetime was the world's largest manufacturer of radio-phonograph combinations with automatic record changers, and it also produced table, console, and camera type models, portables and farm sets, while Stewart-Warner has been a prominent manufacturer in the domestic refrigeration field.

NEW WATER VALVE ANNOUNCED BY PENN ELECTRIC SWITCH CO.

TWO new series of water regulating valves for water-cooled refrigeration compressors and condensers have been announced by Penn Electric Switch Co., Goshen, Ind. Sizes in both Series 246 Com-



Exterior view of threaded type Penn Series 246 water regulators.

mercial type and Series 246-N Navy type, for marine service, are available with threaded-, and flanged-type connection. A complete range of sizes from $\frac{1}{4}$ to 4 inches will be available, the manufacturer says.

These water regulators, according to the manufacturer, incorporate greater sensitivity to refrigerant head pressure, minimum spring power requirement, and insure free movement of all working parts. New and inherently different design eliminates sticking of seats . . . water hammer . . . drain plugs . . . rusting of range springs . . . need for lubrication . . . corrosion of, and sedimentation on sliding parts. Inlet and outlet water pressure forces on the port are efficiently controlled by the use of two correctly proportioned rubber diaphragms which also serve as gaskets to prevent leakage . . . all sealing bellows are eliminated. Range spring and sliding parts are not submerged in water. Use of rubber diaphragms and internal design of valve body eliminate necessity for drain plug. Drainage of the valve is not necessary for winter or other standby periods because if freezing occurs, the rubber diaphragms compensate for any expansion with the valve body.

Complete description, specifications, capacity flow charts, dimensional drawings, and large external and internal views are given in Bulletin R-1986. Copies of this new bulletin are available free upon request from Penn Electric Switch Co., Goshen, Ind.

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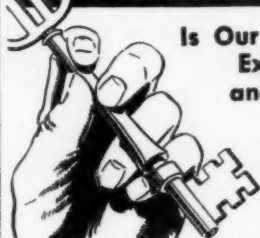
COMPRESSED GAS ASSOCIATION ELECTS COYLE PRESIDENT

THOMAS COYLE, chlorine products manager of the Electrochemicals Department of E. I. du Pont de Nemours & Company, was elected president of the Compressed Gas Manufacturers Association, Inc., January 24, at New York. Mr. Coyle joined Du Pont in 1980 when the company acquired Roessler and Hasslacher Chemical Company with which he had been associated 26 years.

Born at Perth Amboy, N. J., he attended Bethlehem Preparatory School and then was graduated from Lehigh University as a chemical engineer. He had been employed by Roessler and Hasslacher before attending the university and at the conclusion of his course returned to the firm in 1909. He has been manager of chlorine products since R. & H. interests were purchased by the Du Pont Company.

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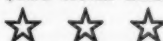
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from our large stock of sup-
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Ansul Chemical Company Announces Changes



TOM PLOUFF



GEORGE VERMILYE



HERMAN GOLDBERG

AN IMPORTANT change in the sales department of the Ansul Chemical Company, Marinette, Wisc., effective January 1 has been announced by F. J. Reed, secretary-treasurer of the company. The change, carrying out some of the company's post-war development plans, involves advancements for two of its well known representatives, Tom Plouff and George Vermilye.

Mr. Plouff, who was formerly in charge of the Des Moines office, takes over the Indianapolis district office formerly managed by Mr. Vermilye, who will be assistant to the sales manager, L. C. "Mac" McKesson in Marinette.

In addition to the Indianapolis territory, Mr. Plouff will continue to cover Kansas and the western half of Missouri. The states of Minnesota, Iowa, North and

South Dakota and Nebraska will be covered by Herman Goldberg, who is in charge of Ansul's Chicago office.

§ § §

Thousands of food parcels packed by volunteers are regularly shipped by the American Red Cross for distribution to American and United Nations prisoners of war and civilian internees in Europe. Similar shipments also go to the Far East. The Red Cross serves on every front. Maintenance of Red Cross services, however, depends upon the response to the 1944 Red Cross War Fund appeal. Let's give!

§ § §

Charles B. Cole has opened an electric sales repair and appliance shop at 4642½ Troost Ave., Kansas City, Mo.

SERVEL CUSTOMER REPAIR SATISFACTION

By using genuine Servel parts, you help assure your customers of complete repair satisfaction. You know what this means in creating good-will—paving the way for post-war sales. So accept only Servel-built parts. Your Servel authorized jobber has them.

SERVEL, Inc.

Electric Refrigeration and Air Conditioning Division
Evansville 20, Indiana

SAVE MANPOWER, GAS, RUBBER and MONEY:

We have on hand, ready for delivery, a complete stock of repair and maintenance parts. May we please serve you?

Our South Side Branch, 809 W. 74th St., Chicago, has a complete stock for your convenience.

Automatic

HEATING & COOLING SUPPLY CO.
647 WEST LAKE STREET, CHICAGO, ILLINOIS

The parts you need are in our stock.

LEO FREITAS RETURNS TO ALCO

AFTER a leave of absence since July, 1942, with the War Production Board in Washington, Leo J. Freitas, of Dallas, Texas, returned in January to his duties as field engineer in the Texas and Oklahoma territory for the Alco Valve Co., St. Louis. Serving WPB in the Refrigeration Section,



LEO J. FREITAS
Alco Valve Co.

General Industrial Equipment Division, he assisted in the administration of Orders L-38 and M-28 and later was chief of the Refrigerant and Accessories unit.

In releasing Mr. Freitas, Fred W. Gardner, director of the General Industrial

Equipment Division, said, in a letter to Alco: "We want to take this opportunity to express to you and to your company our appreciation for sending Mr. Freitas to Washington to assist us in the war work here, when his services were needed so much. Mr. Freitas has performed splendidly and we wish him every success in resuming his activities with your company."

Before joining Alco in January, 1941, Mr. Freitas spent seven years with Fedders Mfg. Co. as experimental engineer, as branch manager at Dallas and at Detroit, and as general field engineer. After that he spent a year with Peerless of America as manager of the Dallas factory branch. His headquarters in Dallas are at 5719 Redwood Lane.

\$\$\$

KRAMER PERSONNEL CHANGES

TWO changes have been announced in the personnel of the Refrigeration department of Fred C. Kramer Company. E. Mousseau, who has been with the company for several years, has been appointed refrigeration manager. George Goodwin, formerly of the pricing department, has been appointed to call on the trade.

JARROW REPLACEMENT DOOR GASKETS

Your customers will always be satisfied with a JARROW gasket. Odorless and grease resistant.

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Water valves	\$2.50

COLD CONTROLS

Domestic	\$2.25
Commercial (low or pressure).....	\$2.50
Commercial (high & low).....	\$3.25

All prices F. O. B. Chicago

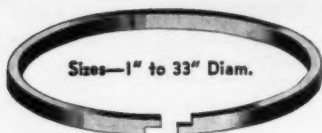
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 PRODUCTS, Inc.**
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FOR SALE—Frigidaire, water-cooled SO² used high-sides. 50 model "N" \$65.00, 35 Model "C" \$85.00. All units in running condition with 60 cycle 110-220 volts, motors. Write for our surplus list. Edison Cooling Corp. Dept. "E", 310 E. 149th St., New York 51, N.Y.

FOR SALE—10,000 High Side floats. In lots of 1,000 @ 25c each. Write for particulars and quotations on 250 and 500 lots. Address Box NO-4, REFRIGERATION SERVICE ENGINEER, 435 N. Waller Ave., Chicago 44, Illinois.

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ideas you can use—
don't miss an issue.**



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When men in the trade get together and someone sets up a moan about how tough it is to get Parts, Tools, and Equipment, it's almost certain that somebody will direct the "moan" to AIRO. Why? Because AIRO has established a reputation for "having it." . . . If you have a particular "moan" right now, send for the newest AIRO catalog. Chances are we can fix you up, too.

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Price: \$1.00 for up to 1 Ton Dehydrator — F.O.B. New York. All strings must accompany order.

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310 E. 149th St. New York City 51

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Unsurpassed Sensitivity and Dependability

FEATURES

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the refrigeration industry

Davco Silica Gel . . . by Davison . . . gives you the results you expect from a drying agent developed by those who know your problems.

You get MAXIMUM CAPACITY . . . REMOVAL OF ACIDS AND CORROSIVE COMPOUNDS . . . FREEDOM FROM DUSTING . . . INSTANTANEOUS ACTION . . . true 100% drying agent performance.

And in addition, Davco Silica Gel is chemically inert and unaffected by oil. It is processed to assure large contact between refrigerant and drying agent . . . the hazard of "channelling" is eliminated.

Specify Davco Silica Gel from your jobber . . . in factory-charged dehydrators or for refilling.

THE DAVISON CHEMICAL CORPORATION

Progress through Chemistry

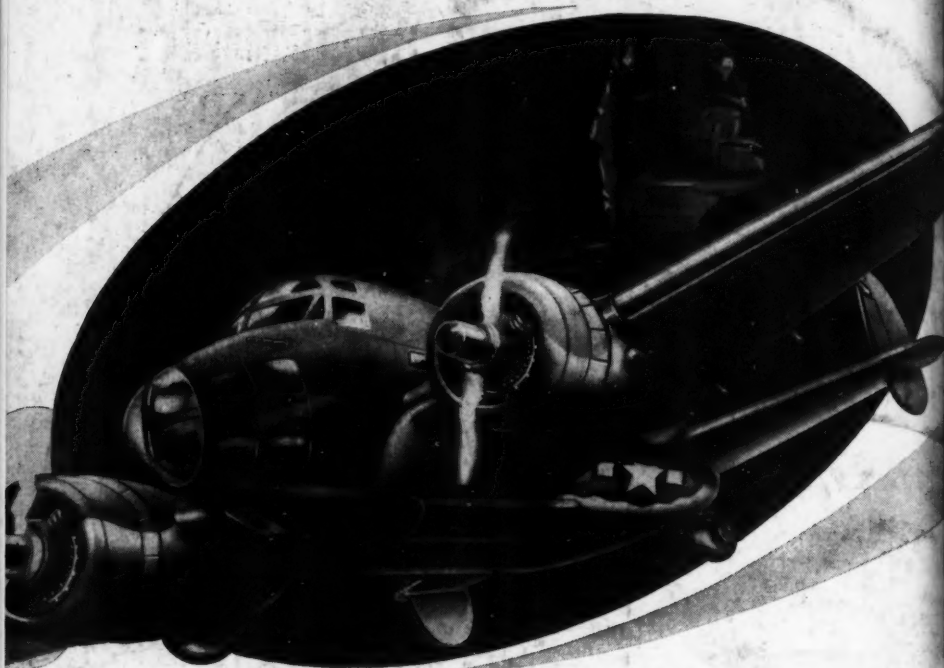


BALTIMORE-3, MD.

Canadian exclusive sales agent for DAVCO SILICA GEL: CANADIAN INDUSTRIES LIMITED
GENERAL CHEMICALS DIVISION

BONNEY TOOLS

proved on the testing ground of time



BACK of the tremendous striking power displayed by the Army Air Forces on every fighting front is a story of tools. Tools for production—for original equipment—for maintenance and service in every section of the world.

For without properly designed, well-made tools America's Fighting Planes would never have been built—could never receive the thorough servicing and maintenance of the highly skilled ground crews.

BONNEY TOOLS have played no small part in helping to meet the hand tool needs of the aircraft industry—manufacturers and workers—and the ground crews of the Air Forces. Pioneers of mechanics' hand tools for the aircraft industry, BONNEY TOOLS are on the production lines of leading aircraft and aircraft equipment factories—in the individual

tool kits of uncounted thousands of aircraft workers. For years they have been and still are standard, original equipment for every one of tens of thousands of engines shipped by leading aircraft engine manufacturers.

Proved on the testing ground of time—their quality has earned them the reputation "the finest that money can buy".

Take good care of your BONNEY TOOLS. Because the demand for them from our Armed Forces has been so great, you may not have been able to obtain all the BONNEY TOOLS you need, in spite of tremendously increased production facilities. Make sure you use the right tool for every job. With proper care and use your BONNEY TOOLS will last for the duration.



BONNEY FORGE & TOOL WORKS, ALLENTOWN, PA.

